Paper TRADE JOURNAL

JANUARY 5, 1950 PUBLISHED WEEKLY

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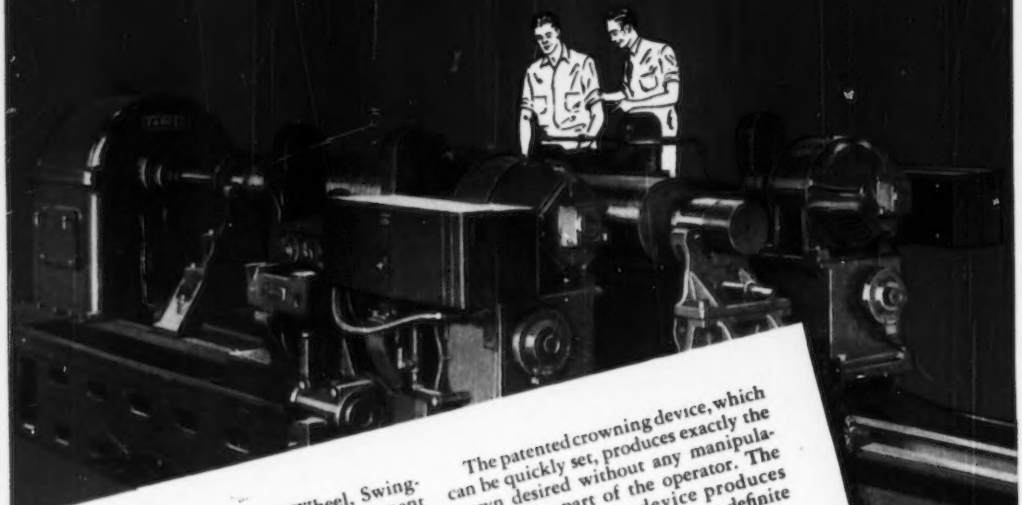

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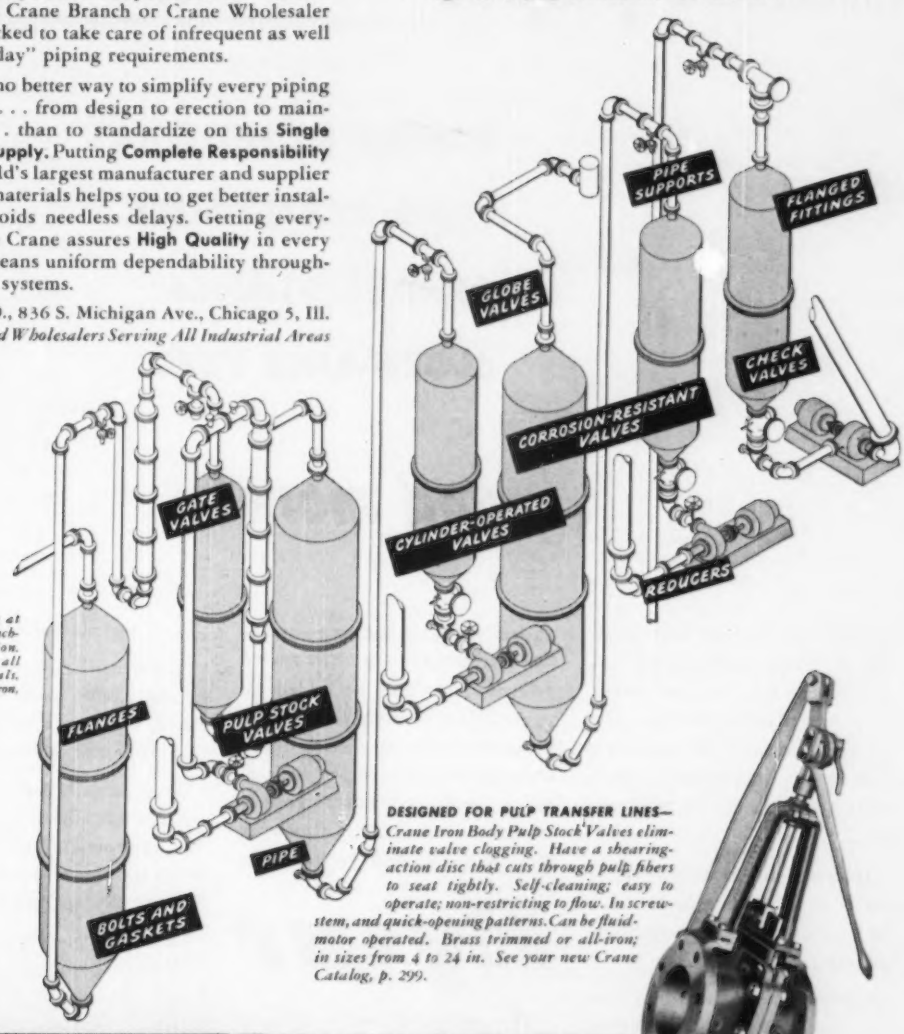

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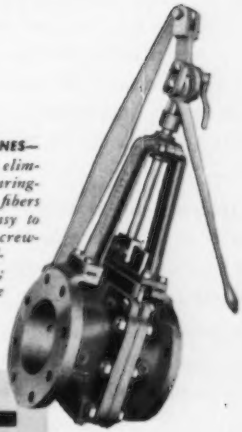

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JANUARY 5, 1950

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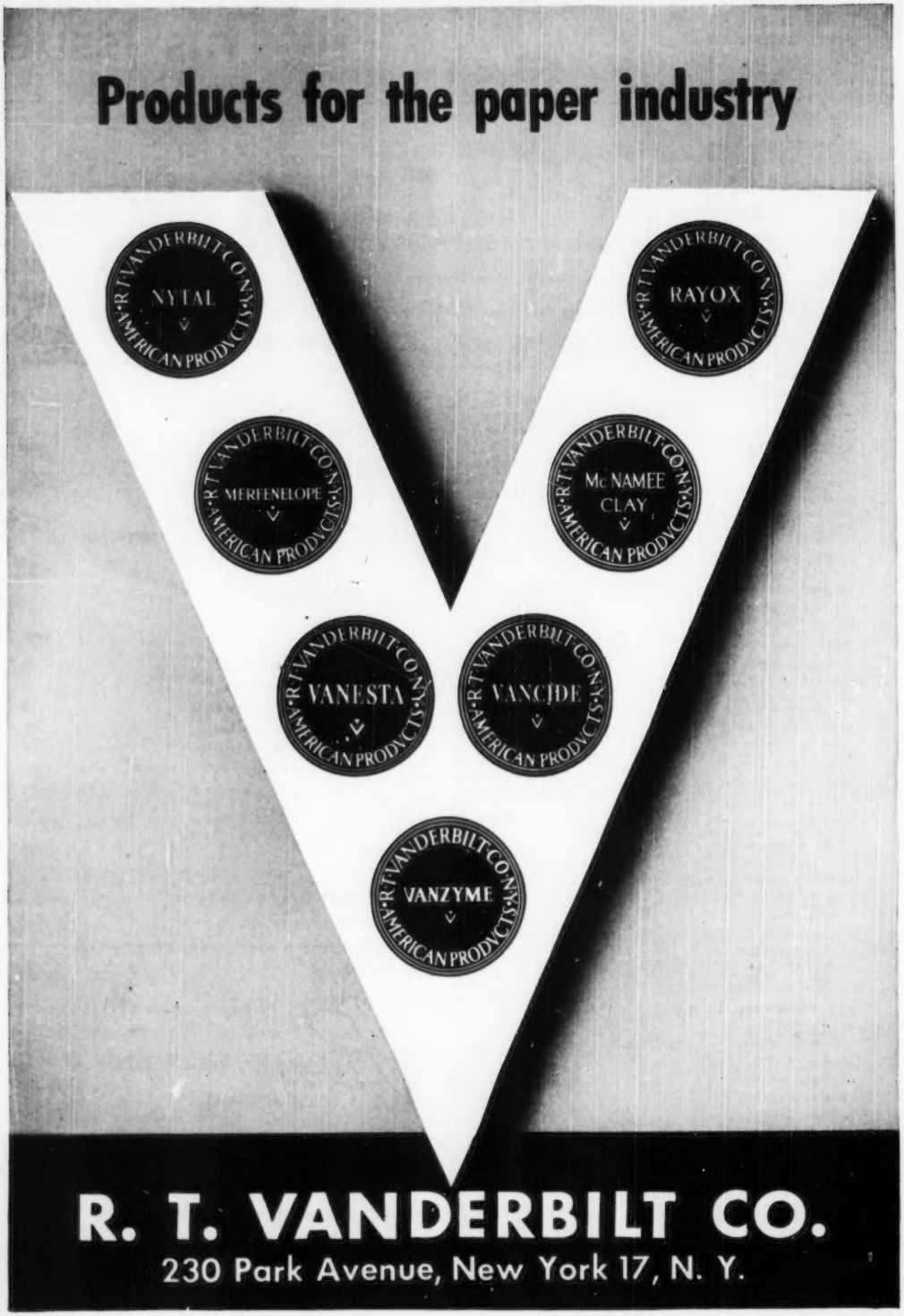
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Paper TRADE JOURNAL

TRENDS

Office of the PAPER TRADE JOURNAL,
Wednesday, January 4, 1950.

Judging from the pattern set for the nation's economy by all our economists, "the good old days" of peace and plenty are ours for the first half of 1950. Even to those not enamored by the conclusions of economists, cold facts point up a period of ready cash, heavy consumer spending, and ample supply for the next several months.

Crest of the Construction Cycle

In appraising the outlook for the first half of 1950, we should always remember that we are on the crest of the wave of the so-called "construction cycle," Winfield W. Riefler, Washington economist, told a Cleveland gathering of laymen sponsored by NICB.

"A major reason why I share the view that levels of output will probably rise during the months immediately ahead is the rate of prospective activity in the construction industry," Mr. Riefler said, quoting Government predictions that new construction expenditures in 1950 will equal 1949's 19 billion dollars. Continued large-scale demands for automobiles, houses and other durables also were cited. In general, the overall financial position of business is sound, the supply of credit large and elastic, and the cost relatively low, Mr. Reifler believes.

Broad Adaptation Is Real Problem

The source of apprehension and disquietude for the immediate future lie not in the danger of renewal of active inflationary development, nor in the problem of downward readjustment in farm income and business expenditures that may have to be faced late in 1950. These problems are real but do not necessarily lead to basic difficulties if prices, particularly those offered to consumers, remain flexible and responsible. "The forces which have really shaped the picture and provided the framework within which we operate have been external rather than internal." It remains generally true that the major fluctuations in prices, production, employment, money incomes or real incomes, etc., have been conditioned primarily by our responses, either positive or negative to the breakdown in the world order." Pointing up the one aspect of the broad canvas where we face real problems of broad adaptation in the immediate future, Mr. Riefler named the import position.

Our economy from its inception was geared to promote exports, a need which disappeared as a result of the reversal in our world economic position during the first World War. Ever since, the smallness of our import position relative to our export industries has presented a primary basic problem of adaptation to our economy. Large-scale foreign loans provided dollars for our exports during the twenties, and thus postponed for a time the problem of readaptation. The collapse of our exports during the thirties when this outflow of investment stopped; the revival and expansion of our export industries during the past decade — based essentially upon dollars appropriated by Congress to aid the war effort; and the postwar effort to build a new secure self-sustaining economy in the Western world; constitutes a development which has not progressed to a point where the problem of internal adaptation is not likely to be much further postponed.

> Without being an apostle of gloom, it is possible to see in the rosy forecasts for early 1950 a shadow of disaster. Because of our temperamental bent for enjoying the present, it is likely that the next few months could be a strong temptation to believe we have returned to the prosperity of the 1920's. We dare not delude ourselves into such false safety. The prewar world has gone. The world's problems are ours.
>
> "If businessmen feel that their prospects are reasonably good, that hard work and ingenuity will produce a fair return; that Government policies will permit them to keep a reasonable part of this return; that, in the main, the other segments of our community are willing to recognize the substance and reality of the businessmen's problems; business can, and I believe will, move ahead profitably to the benefit of itself and all other groups in our society," Secretary of Commerce Sawyer said in his message to Dr. Steelman, assistant to President Truman.
>
> These months of good business can be a breather as we tackle the major problems of adaptation. "A good householder," said Seneca, "hopes for the best but prepares for the worst."

During the coming year, Mr. Riefler believes the so-called "dollar gap" is much more likely to measure the willingness and ability of the American economy to accept European imports than the ability of Western Europe to part with goods for sale. To our economy, internal adaptation will be required whichever form the solution takes. If imports are accepted in sufficiently large volume to ease the position, we will face the problem of various local pockets of unemployment pending readaptation in the internal economy, a development we feared and tried to forestall through high tariffs. The acceptance of an increased volume of imports is, in Mr. Riefler's reasoning, the least depressive policy to pursue. So long as we are enjoying an expanding economy, our markets will be very broad. They should be able to absorb a considerably increased volume of imports, sufficient to make a significant contribution to the narrowing of the dollar gap without vulnerable local industries being too seriously affected. If the adaptation takes the form of an equivalent restriction of our exports, the problem of adaptation will be magnified, particularly to the extent that it reduces our exports of agricultural products. (We still have to face the implications of a transition from our war-stimulated agricultural output . . . a problem that will be difficult enough. Loss of foreign markets that would normally be ours in a world economy characterized by equilibrium and efficient utilization of resources would aggravate the problem.)

To continue to rely on the Treasury to avoid this basic problem of internal adaptation is a line of action that runs directly into that of public budgets, which are now equivalent to one-fourth of our gross national product. Moreover, we probably shall continue to need all the funds we can afford for defense for a considerable period.

Mr. Riefler concluded by expressing his faith that the nation will make the adaptation in a form worthy of a democracy whose history has been that it has met its major problems responsibly.

Production Indexes

Ratio of production of unbleached craft paper to potential mill capacity for that product was 87.5 percent for the week ended December 24, compared with 93.7 for the preceding week, and with 79.0 for the corresponding week of last year.

Comparative ratios of U.S. paper and paperboard production to mill capacity, as reported by AP&PA, are:

	Dec. 24 1949	Dec. 17 1949	Dec. 25 1948	Dec. 27 1947	Dec. 28 1946
Paper	87.2	‡98.4	74.6	74.9	71.8
Paperboard	92.0	92.0	87.0	77.0	66.0

‡ Revised. p

Paperboard Production (Tons)*

	Dec. 24 1949	Dec. 17 1949	Dec. 25 1948
Production	200,595	204,204	174,319
New Orders	153,405	167,483	139,128
Unfilled Orders	327,641	377,366	285,601

Source: NPA.

General Business Indexes

Index of general business activity for the week ended December 24 eased to 150.2 from 151.5 in the preceding week, compared with 152.9 in the corresponding week of 1948.

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Paper TRADE JOURNAL

News of the Week

Potlatch Forests Mill To Secure Jobs

LEWISTON, Idaho — A new pulp and paper mill to be built by Potlatch Forests, Inc., will secure the jobs of employes and provide additional jobs for 300 to 350 more, PFI President William P. Davis said in an address before more than 200 key men of the corporation.

Mr. Davis said the corporation is going into the pulp and paper business because "we couldn't expect to continue stable operations very far into the future under a pine economy.

"We are entering an era of very stiff competition. If we didn't make use of our waste woods, both at the mill and in the forests, we would be in a tough competitive situation and all of our employes' jobs would be in jeopardy. By building the pulp mill, however, we will be able to utilize waste woods and mixed species of timber not profitable as lumber, not only adding new jobs but perpetuating the jobs of present personnel." He said the pulp mill will secure the operation on a two-shift basis.

Kodak Promotes John McMaster

ROCHESTER, N. Y. — John McMaster has been appointed assistant manager of the graphic arts sensitized goods sales division of the Eastman Kodak Co. The appointment is effective January 1.

A native of London, England, Mr. McMaster first worked at Kodak during the summers of 1919 and 1920, starting regular employment as a chemist in the baryta department at Kodak Park in November, 1927. Transferred to the paper service department in June, 1929, he became assistant supervisor of that department the following year. He was assigned to the sales division at Kodak office in 1933.

In April, 1934, Mr. McMaster joined the staff of the graphic arts sales division, where he remained until May, 1942. At that time he was transferred to government sales in Washington, D. C., to handle graphic arts contracts. He enlisted in the U. S. Navy, Bureau of Aeronautics, in February, 1943, and returned to Kodak's graphic arts sales in December, 1945.

Quality Our Guide

SPRINGFIELD, Mass. — "Quality Our Guide — Perfection Our Goal" was the prize winning slogan for the month of November in Strathmore's quality education program and won a $50 U. S. Saving Bond for Frank Golansky, its author, who is employed in the power department of the Strathmore Paper Company.

Fibreboard Products Elects Officers

Meeting for the first time in the corporation's new offices, which occupy the sixth and seventh floors of the San Francisco Div. at 1789 Montgomery street, the stockholders of Fibreboard Products, Inc., authorized an increase in the number of directors from 9 to 11.

All present directors were re-elected. In addition, C. C. Gibson, a director and executive vice-president of The Paraffine Co., Inc., and A. B. Layton, vice-president of Crown Zellerbach Corp., were elected new members of the board.

T. N. BLAND

At a meeting of the board of directors, following the stockholders' meeting, D. H. Patterson, Jr., resigned as president and T. N. Bland was elected to the office. R. B. Knott, controller, was elected to fill a newly created office, that of vice-president in charge of finance. Finley Thompson was elected controller and B. R. Colkett, secretary.

All other officers of the corporation were re-elected.

Goeppinger Resigns From Marcalus

EAST PATERSON, N. J.—Otto J. Goeppinger resigned as manager and superintendent of Marcalus Mfg. Co. with which he was connected since 1942. He was in charge of papermaking and converting plant on all tissue products.

After making many improvements on their Yankee Machine he designed, housed, installed and operated one of the latest type parchmentizing machines for genuine vegetable parchment using new methods of acid treatment, reducing acid consumption. On his return from a trip South, Mr. Goeppinger will reopen his office as consultant for paper mills at 11 W. 42nd street, New York. He is a member of TAPPI and the Superintendents association.

Powell River Absorbs Freight Charges

LOS ANGELES — Powell River Sales Co., Ltd., announced it will eliminate certain extra freight charges on its newsprint effective January 1. The result will be reduced prices for some of its customers, including those in California and the southwest.

The company has been charging $102 a ton for paper delivered at San Francisco and $103 at Los Angeles. The new delivered price at both points will be $100. An example of the effect of the new policy in the southwest will be a cut in delivered price at Dalals from slightly over $116 to $111 a ton.

The company emphasized that its action does not represent a cut in the basic price of newsprint, but merely an absorption of various freight charges.

The company has been passing along a portion of transportation costs to customers, with the result that its Los Angeles-San Francisco delivered prices, for example, have been $2 to $3 a ton higher this year than competitors'.

Cuminale Joins Merrimac

NEW YORK — Richard P. Cuminale, former representative of Clarenmont Paper Co., will become associated with Merrimac Paper Co., Inc., it was announced recently. Mr. Cuminale's activities will be in connection with the sale of Merrimac's special and technical papers. He will make his headquarters at the company's New York office, 295 Madison avenue.

After his discharge from the Army in 1945, Mr. Cuminale was with Bulkley, Dunton & Co. in their specialty papers department. Following this association, he was connected with Claremont Paper Co. of New York, in the capacity of treasurer and sales manager. This company was the sales agent for the Claremont mill. Subsequently, Mr. Cuminale became executive vice-president and treasurer of Crown-Mark Paper Div. of Lynham Industrial Corp., which took over the Claremont Mill Sales Agency.

Schweitzer Buys Smith Paper Co. In Big Deal

A week or so ago Paper Trade Journal received a report of the purchase of Smith Paper Co., Lee, Mass. by Peter J. Schweitzer, Inc. However, Mr. Louis Schweitzer requested some delay in reporting the deal as the consummation plans were then not quite complete. He now has approved the following release:

LOUIS P. SCHWEITZER
President, Peter J. Schweitzer, Inc.

One of the largest transactions in the paper industry in recent years was made known with the announcement that Peter J. Schweitzer, Inc., leading U. S. manufacturers of fine papers used by industry and in the manufacture of cigarettes, had purchased the Smith Paper Co., Lee, Mass. Announcement was made in New York by Louis P. Schweitzer, president; William P. Schweitzer, vice-president and M. Peter Schweitzer, treasurer; the three brothers who head the Schweitzer firm established by their father, Peter J. Schweitzer. The amount involved was not disclosed, but assets of the Smith company, oldest specialized United States paper manufacturers, are reportedly in excess of $10,000,000. The deal, it was stated, was privately financed.

The Schweitzer company, whose plants are located in Jersey City, Elizabeth and Spotswood, N. J. and at Mt. Holly Springs, Pa., employs 750 people in the manufacture of paper used in the production, among others, of Lucky Strike, Pall Mall, Herbert Tareyton, Philip Morris, Life and Regent Cigarettes; and in a wide variety of Canadian brands, including MacDonalds and Players. The Schweitzers also own the Papeteries de Malaucene in Carpentras, France, supplying cigarette paper in that country and other European countries, and who do an extensive business in the Far East.

The Smith Paper Co., which was purchased from Brown & Williamson Tobacco Corp. with headquarters in Louisville, Ky., manufactures paper for Raleighs, Kools, Viceroy and Wings. It also makes so-called booklet paper used by "roll-your-own" smokers. The firm, founded in 1835, operates the Eagle, Columbia, Niagara, Centennial and Valley plants, all located in or around Lee.

Both firms are also leading manufacturers of condenser paper used in almost every type of electrical equipment, and of carbonizing tissues, the paper from which carbon paper for business and general purposes is made.

Assets of the Schweitzer concern have never been made public because the company is entirely family owned, but it is noted in the industry that Schweitzer operates ten paper machines, including the world's largest cigarette paper machine, while Smith operates eight.

Discussing industry-prospects and plans in connection with the purchase, Mr. Schweitzer said: "We expect that 1950 will be a highly favorable one. Continued increases in the consumption of cigarettes indicate a wider domestic market for quality cigarette papers. Although long unsettled orders, which have been coming in, indicate that the Far East, for years second only to the United States in overseas cigarette consumption, will soon become an important market once again. In our own operation, we expect to consolidate the facilities of the Smith company with our own so as to provide the best possible services."

Established in 1908, Peter J. Schweitzer, Inc. was originally an importer of cigarette paper. When World War I cut off European supply, Schweitzer established its first U. S. mill in 1920 at Jersey City, the two oldest sons were sent to the University of Grenoble and gained practical experience at the Schweitzer mill in Southern France. The father's death at the age of 47 in 1922 put his son, Louis, then twenty-three, and William, twenty-one, in command of the business headed by their mother, Rebecca, then 42. The growth of the firm from this point is indicated by the fact that the company now does approximately ten time as much business as in 1922.

The Smith firm was founded by the then twenty-three year old Elizur Smith, who purchased the first paper mill built in Lee in 1806. Smith had the company for 55 years. The company, which started with the manufacture of writing, ledger, printing and book paper, purchased the Centennial mill in 1850. It was the first mill in the United States to use wood pulp in the manufacture of paper and the first to use American flax fiber in the commercial production of cigarette paper.

Pollution Stay Granted

GREEN BAY, Wis. — The Wisconsin committee on water pollution Thursday night gave six Fox river paper mills more time to comply with state orders to start cleaning up the river—termed the worst polluted stream in Wisconsin.

J. W. Conway, Green Bay, president of the league set up by the manufacturers to conduct research, said that despite all the studies and investigations in the United States and in Europe, no practical solution to the pollution problem had been found. However, he said, "progress has been made. There have been several new developments. We will submit plans and if the state approves, we will build."

To Buy Brompton Power Plant and Mill

OTTAWA — The ratepayers of Sherbrooke, Que., have approved by 4 to 1 a bylaw authorizing that city to float a $1.5 million bond issue to purchase the power site and mill of Brompton Pulp and Paper Co. at Bromptonville, Que., with the proceeds to be used to install new power facilities as well as to pay the $725,000 purchase price. When the former Brompton power plant is altered, an additional 10,000 hp. may become available.

Rayonier's Land Department Moves

PORT ANGELES, Wash. — Rayonier, Inc. will move its land department office from Olympia, Wash. to the company's Hoquiam, Wash. office building at 8th and Levee streets on February 1.

Space will be provided for the expansion by renting a portion of the building adjoining Rayonier's and owned by the Twin River Stevedoring and Tug Co. Alterations have been planned to provide access to the new office space through the main entrance of the Rayonier building. Offices of the company in the Hoquiam Masonic Temple will also be closed and the logging engineering section of the timber division will be moved to the new quarters.

The timber division, located at Hoquiam, has the obligation and responsibility to supply the wood requirements of the company's mills at Grays Harbor, Shelton and Port Angeles, Wash. The company's forestry program to develop its timber properties into a sustained yield unit of a continuously growing crop of timber to supply its Northwest mills and to provide continuing employment throughout the area, can be most efficiently carried on from Hoquiam.

Personnel involved in the move from Olympia are Len J. Forrest, land department manager, and Foresters Roy C. Carlson and William J. Snider.

Coincident with the moving of the land departments, President Edward Bartsch announced the promotion of John H. Beach to the position of assistant manager, land department, and of Wilton L. Vincent to the position of assistant manager, timber division. John E. Norkool has been promoted to the position of logging engineer in the Grays Harbor, Wash. area to fill the vacancy created by the promotion of Mr. Beach.

Rhinelander Service Award to Ten

RHINELANDER, Wis. — On Wednesday, December 21, N. F. Becker, president of Rhinelander Paper Co., presented Lord Elgin watches to ten of the company employees as a token of appreciation for their 25 years of continued service with the company.

This is the 3rd year that these awards have been made, and the Quarter Century Club now consists of 47 members. All but six are still with the company. The following are the new members:—

Joe Phillips, Carl Lammert, Blythe Hubbard, Andrew Olsen, Walter Larson, Clarence Derocher, Darrell Peevey, John T. Palm, A. R. Barber, and Edward Cody.

Gilber Paper Announces Envelope

MENASHA, Wis.—Announcement of a revolutionary new bond envelope, to fill several long-felt needs in business stationery, is made by the Gilbert Paper Co. The envelope is made from Gilbert envelope bond, a special 25 percent new cotton fibre paper. Major feature of the envelope is its ability to seal instantly and positively by hand or high-speed machine methods. This is achieved by means of a new Gilbert cotton-fibre-content paper with special surface characteristics, for which the gum has an exceptional affinity, forming a seal so tight that the paper tears while the adhesion remains intact, when opening is attempted. Envelopes made from the new Gilbert envelope bond are available in all sizes from Gilbert quality paper merchants, the American Envelope Co., and other leading envelope manufacturers.

Marathon Reports Increased Sales

ROTHSCHILD, Wis.—Net sales of the Marathon Corp. in the fiscal year ended October 31, 1949, were $60,048,380, compared with $56,766,915 in the preceding year, D. C. Everest, president, has reported. The company showed net earnings of $4,519,217 after provision for income taxes, as against $5,593,238 a year ago. After preferred stock dividend requirements, the latest year's earnings were equal to $3.29 a share on 1,300,000 shares of $6.25 par value common stock outstanding, compared with $4.11 a share on the same basis last year.

Stone Transferred to Atlanta

ATLANTA, Ga.—James E. Stone has been appointed manager of the Atlanta district sales office of the Scott Paper Co. Mr. Stone had been manager of the company's Tampa-Miami district since 1947. He joined the Scott company in 1945.

Duty on Bible Paper

NEW YORK—Opaque printing paper, or bible paper, is subjected to duty at 2c per pound plus 5 percent even though it contains no rag pulp, according to a Customs Bureau ruling. Such paper has been classified as uncoated printing paper at 1/5c per pound plus 5 percent, and because the charge will result in an increase the bureau directs that it shall not apply except as to shipments entered or withdrawn from bond for consumption after Dec. 17.

Canada Comments

OTTAWA — Year-end statements by heads of pulp and paper companies indicate a general opinion that 1950 will be another year of high production for the industry in Canada and that demand for its products will be maintained, particularly newsprint, with prices likely to remain at current levels for both pulp and paper at least in the first quarter or first half of 1950.

In face of the uncertainty about foreign markets which marks the start of 1950, there is considerable opinion that even non-dollar countries, such as the United Kingdom, Australia and others, may not be able to get all the supplies they want in Scandinavian countries so that such countries may purchase at least smaller quantities in Canada before the end of 1950. Then again, it is understood that the Canadian Government may help such efforts to get more trade for the Canadian industry by some sales attempts or arrangements to stimulate business. Already reports are coming in about less employment opportunities in the logging industry across Canada, and, if foreign markets dwindle for the pulp and paper industry, there is no doubt here that strenuous efforts would be made to stimulate more exports, especially to replace continually dwindling markets or drum up new business elsewhere.

Of course, officials of pulp and paper companies expect the United States market to continue its present high consumption of Canadian products and this is emphasized by leaders in the industry in their year-end statements about the outlook for 1950. "The American market will, of course, continue to be the mainstay of the industry and it seems reasonable to suppose that American requirements will continue at a high level throughout 1950," D. W. Ambridge, president and general manager, Abitibi Power & Paper Co., Ltd., has gone on record as stating in a year-end report.

"The business outlook for the United States, our principal market, is good at least for the first half of 1950," is the forecast of General Manager E. M. Little, Anglo-Canadian Pulp & Paper Mills Ltd., in a year-end statement. "Opinion differs as to whether the expected high level of business for the first half of next year will continue throughout the year."

Other leaders in the industry appear to believe that long-range predictions about the outlook for the pulp and paper industry in 1950 should not be made this year due to the international trade situation and currency problems, though there is a definite undertone of optimism that at least for the first half of 1950 the Canadian pulp and paper industry will have a continued high level of activity and that what will happen in the latter half of this year will depend upon the developments in the export field.

Readjustments are in the making for the pulp and paper industry during 1950, it is learned, and this means that inventories will be watched even more closely than in 1949, competitive conditions may become more competitive, and the prospects for profits in operations may undergo a change, with a favorable earnings record generally anticipated.

Plan Institute of Forest Products

As the result of an organization meeting held here recently, it is learned now that a new nation-wide body to publicize the uses of wood and wood products may come into existence within a relatively short time and it will be known as The Canadian Institute of Forest Products, with the headquarters of the organization expected to be either in Montreal or Ottawa.

New Knowledge in Forestry

Abstracted from the Report of the Chief of the Forest Service, Lyle F. Watts, 1949

Forest-Management Research

Research in forest management aims to make the business of growing timber stable and profitable. To that end it must discover practical methods of regenerating forests; it must acquire knowledge of the life histories and requirements of trees and learn how to use that knowledge to produce useful timber; it must devise ways to measure volume and growth and to predict yields; it must consider the cost of procedures it develops in relation to gains they make possible; and it must synthesize all these findings into schemes for regulating forests growth so that trees come to maturity in an orderly progression, furnishing the maximum return from timber crops harvested regularly and perpetually.

* * *

More recently, research on nursery practice and on planting methods has helped to lower the costs and increase the success of reforestation in various sections of the country. The work of the Forest Service on naval stores has brought many findings of great value to that industry. Development of acid stimulation to increase gum yield is a notable recent example.

* * *

In the Lake States research has shown how to follow nature in the selective cutting of northern hardwoods, and is approaching the secret of the ideal stand density for that forest type. In the California pine region we have found out how to anticipate the bark beetles and save, by well-timed harvest, great volumes of timber that would otherwise be lost. In the Northern Rocky Mountains valuable crops of western white pine can be grown in spite of the blister rust. Elsewhere in this region, we are learning that through strip cutting the needs for timber products can be met and watershed values protected or improved. In the Northwest practical logging systems are being worked out to get good reproduction of Douglas fir. In the Southwest, where heat and drought make it nip and tuck between forests and grassland, we have learned to cut little and often, always leaving the best trees. In New England we are learning to live with the spruce budworm and still produce continuous crops of spruce and fir. In the Central States research is showing how to make valuable forests grow on the spoil banks created by surface mining. And in the South it is showing that good forestry can pay in a surprisingly big way.

Thus, research in forest management has attempted to meet the needs of changing times. Future trends must be anticipated so that research of a long-term nature can be started soon enough to provide the answers when needed. Of utmost importance is intensification of research to determine the most efficient cutting rates and silvicultural measures for converting unmanaged forests to managed forests. Research must be extended to forest types thus far little studied. A small but growing interest in really intensive forest management points to a new era of silvicultural research, and reorientation of Forest Service research programs to meet this anticipated need is under way.

* * *

Business of Growing Timber

At the Lake City Research Center in Florida, good management of a 53-acre farm woodland for a variety of products, including cross ties, pulpwood, and naval stores, has brought in over $8 per acre per year since the experiment was started 5 years ago. During that time the stand has been improved; yields are likely to increase in the future. Similar studies at a number of other research centers prove that well-integrated forest management can be profitable on small holdings.

The Forest Service plans to continue its attack on such problems as how to make the most of aspen in the Lake States and intermountain region, lodgepole pine and true firs in the Northern Rockies and Pacific Northwest, and other species heretofore little used. It will keep on trying to find better, cheaper, and faster ways to reforest the raw earth exposed by surface mining. It will endeavor to work out management practices and control measures that will keep down troublesome forests insects and diseases.

The littleleaf disease of shortleaf pine in the South and the pole blight of western white pine are causing increasing concern. At the present stage of knowledge, these diseases are still mysteries. While pathologists seek the causal organisms, foresters must investigate the environment and physiology of the sick trees and look for ways to handle the stands or replace the species so as to make losses as little as possible.

* * *

Forest Influences

Research in forest influences is directed toward solving the many soil and water problems that have developed from use of forest and range resources and the growing demand for water supplies and flood control. Solution of these problems lies in the development and application of sound watershed-management practices. On most wildland areas these practices should allow other uses, such as timber production or grazing, without endangering soil and water resources. For certain areas of critical watershed importance, special practices will be necessary to protect the watershed from erosion or to obtain and safely maintain the highest usable water yields.

* * *

In Utah a combination of contour trenches and reseeding was devised that successfully controlled runoff even from intense storms that produced floods on nearby untreated areas.

* * *

Increased Water Yields

As the influence of vegetation on stream flow became more and more evident, it was seen that vegetation might be manipulated to control stream flow. In areas where water supply is the limiting factor to development (and there are many such areas in both the East and the West) research has begun to explore the possibility that water can be conserved by reducing vegetative cover to the minimum required for site protection. Where this is feasible, the benefit to western irrigation agriculture is obvious; and similar benefits could perhaps be realized in parts of the East, where water demand is beginning to exceed supply.

* * *

The Forest Survey

The McSweeney-McNary Act of 1928 authorizes a nation-wide survey of forest resources — the first complete survey ever undertaken of forest resources and conditions on the nation's 624,000,000 acres of forest land. Field work was begun in 1930 to obtain accurate and detailed facts as to the area and location of forest lands, volume and character of timber resources, ownership of forest land and timber,

present and potential rates of timber growth, timber drain from cutting and destructive agencies, and potential future requirements for various forest products. Such facts are fundamental to both public and private programs for better forest management. They are basic to plans for long-term development of wood-using industries.

* * *

An important phase of this nationwide survey of forest resources has been the determination of probable future requirements for timber products. Together with basic facts on available resources and prospective timber growth, these investigations provide data needed for determining ways and means of balancing the nation's timber budget. Detailed investigations have been made to determine lumber requirements for housing, farm construction, mining, shipping, and a number of other purposes. General appraisals of potential requirements for all major timber products were prepared in connection with the forest reappraisal of 1945. During the past year a survey was started to determine the amounts and kind of wood used in manufacture and in the shipping of manufactured products.

* * *

The financial aspects of private forestry have long constituted an important field of research. Studies at such locations as the Crossett Experimental Forest are conclusively demonstrating how substantial incomes can be obtained from the frequent partial cutting of managed forests. Investigations have also been made of forest taxation as a factor influencing timber growing and utilization. Early tax studies, summarized in a comprehensive Forest Taxation Inquiry report, focused attention on the fact that remedies for forest tax problems involved sweeping improvements in governmental organization and tax administration, as well as special forest tax legislation. At present, Forest Service activities in this field are confined largely to advisory services to States and local governments on special tax problems.

The requirements for establishing credit facilities to finance longterm forestry enterprises also have been investigated from time to time and principles developed for a federally sponsored forest credit system. Other studies have explored the problem of providing equitable forest fire insurance.

* * *

Facts Are Needed

Each step in the long process of growing, processing, and marketing forest products is associated with complex economic and social problems. With the task of shifting from a forest economy based upon exploitation of virgin timber resources to one based upon growing new timber crops, difficult questions arise for both public forestry agencies and private business. Economic considerations become more and more important as shortages of timber supply require closer utilization, as competition from other materials affects timber markets and incomes, as patterns of land use change, and as permanent forestry assumes increasing importance in local and national economies. The long-term planning necessary for growing merchantable timber crops introduces special problems not encountered in most other economic activities. In the years ahead, the Forest Service will continue its efforts to provide needed information on all phases of the broad field of forest economics.

* * *

Containers

The container industry in the United States uses vast quantities of lumber, veneer, and pulp products. Research on shipping containers by the Forest Service dates from the earliest days of its existence. A Forest Service circular published in 1906 showed how "increasing scarcity of familiar materials" could be relieved by substituting six other species for scarce white pine. Principles evolved from the early studies have found extensive use both here and abroad in developing containers of greater strength from less material. They have saved manufacturers and shippers millions of dollars through reduction of shipping and breakage losses.

Numerous container-testing techniques have been developed. Many of them are now used throughout the world. One of the testing machines is a huge revolving drum which always attracts the interest of visitors to the laboratory. Boxes or cartons tested in this drum get more rough treatment than the burliest of freight handlers would ever give them.

Rules and formulas for design are being worked out for fiberboard containers that will be comparable to those previously worked out for other types of containers. A study is under way on the panel type of construction employing wood cleats. Other studies cover blocking, bracing, and cushioning of commodities in containers.

* * *

Pulp and Paper

Need for extending the range of species used for the manufacture of wood pulp was recognized long ago. It was clearly indicated that spruce, fir, and hemlock could not continue to meet our expanding pulpwood requirements. Accordingly the Forest Service undertook a systematic study of the suitability of more than 100 American woods for production of wood pulp. Outstanding in this early work was the production of good kraft pulp from the southern pines and from jack pine. After the first sulfate pulp mill was established in the South, close contact was maintained with that growing industry to determine the course of future research. Improved processes were developed for bleaching sulfate pulp. Production of sulfate pulp in the South doubled every 5 years until the depression years and increased enormously thereafter. Following investigations at the laboratory, the successful use of Douglas fir and other woods for sulfate pulp has developed within the past few years.

The work on southern pine included investigations on the production of newsprint paper. Tests on numerous combinations of pine and hardwood pulps indicated that several compositions were possible. The one recommended as most practical under existing conditions is now being used in commercial production.

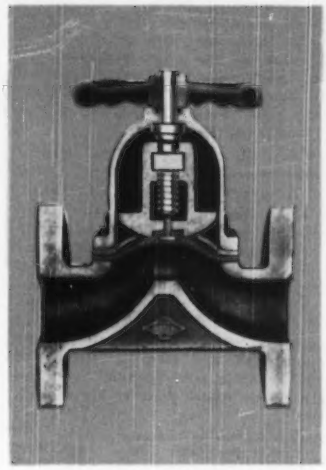
During this early work, it became apparent that the then conventional methods would not be suitable for successful use of some species and new processes would have to be worked out. This led to the laboratory's development of semichemical processes, a combination of chemical and mechanical pulping. A specific method, called the neutral sulfite semichemical process, was found to have wide application and was especially suitable for pulping hardwoods. Recent commercial applications have been for high-quality corrugating board from a number of hardwoods, unbleached and bleached butcher's wrapping paper, and book and magazine papers. Laboratory demonstrations have shown that hardwood neutral sulfite semichemical pulp can be used in making newsprint paper. Other applications are in the course of commercial development. Semichemical pulp production is increasing and this process is a promising one for extensive and economical utilization of low-value hardwoods.

Ground-wood pulp is an important paper-making material because it is obtained in high yield at comparatively low cost. Its use in printing paper has been limited to one or two of the lighter-colored softwoods. Laboratory experiments have led to recent commercial developments in the bleaching of ground-wood pulps which should expand the variety of woods that can be used. The laboratory also has discovered that a number of northern and southern hardwoods have definite possibilities for ground-wood pulping for many of the kinds of paper in which softwood is now used. In parts of the United States where most of the ground-wood industry is located, supplies of the more favored softwoods are becoming inadequate to meet present high demands but large quantities of hardwoods are available.

* * *

Harvesting the Timber Crop

Research conducted by the Forest Products Laboratory at commercial logging and milling operations in cooperation with the regional forest experiment stations provided figures on lumber production costs and returns that gave forest managers a definite dollars-and-cents basis for putting selective logging practices into effect. The figures showed that it often does not pay to cut small trees—that the labor and processing costs in cutting



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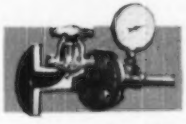

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trees before they reach certain sizes may be greater per thousand board feet than the value of the wood cut.

* * *

Work Ahead

Despite the great strides made in wood utilization, there is still need for more complete utilization of wood waste and low-grade material. There is need for further improvements in the utilization of unpopular species. Wood in natural or improved forms can be made to serve the user still better. Future possibilities in the chemical conversion of wood are almost unlimited. The program for the Forest Products Laboratory calls for intensified work on utilization of wood waste and low-grade materials; further improvements and economies in structural utilization of wood; development of new preservatives and treating methods; improvements in and simplification of gluing techniques; increasing the fire safety of wood; improvements in paint technology; development of new or improved paper products; chemical conversion of wood; and other studies aimed at expanding the uses of wood and making it give better service. Work on lignin especially should be stressed. There is much work to be done on the properties and characteristics of tropical woods as a basis for determining their usefulness to the United States.

* * *

The Research Program for the Future

We still have much to learn in forestry. Some of the many problems yet unsolved have already been mentioned in earlier sections of this report. In all fields of forestry, as in everything else, ways can often be found for further improvement of present practices — for doing things even better and faster and at less cost.

One of the main tasks in forest-management research will be to test many recent findings in the practical money-making business of timber growing. Research recommendations cannot be refined and made fully reliable until this final, pilot-plant work is done.

* * *

New Knowledge Must Be Applied

To find the right answer to a problem is only part of the job. The problem will be met only when the knowledge is put into practice. The results of research, therefore, must be brought out of the textbooks and technical reports and applied on the ground.

Our forestry knowledge is not yet widely practiced. The recent reappraisal of the forest situation showed that only 23 percent of this country's total operating commercial forest land is being managed under cutting practices that rate good or better from the standpoint of keeping the forest in productive condition. A high proportion of this is national forest and other public forest lands. But three-fourths of our commercial forest land is in private ownership. On private forest lands only 8 percent of all cutting practice is in accordance with good management principles. Twenty-eight percent rates fair; 64 percent is poor or destructive. (81 percent of cutting on pulp company lands is rated fair and better.—Ed Note.) This factual statement is made with full recognition and commendation for the private owners who are practicing good forestry.

The annual drain of saw timber from the forests still exceeds the rate of growth. Furthermore, much of the drain is of high-quality old-growth timber, and especially of the more valuable softwoods needed for construction lumber, plywood, and other important uses; whereas much of the growth is of inferior kinds of hardwoods and other poor-quality material. The general quality of our timber growth is steadily deteriorating. Research is finding ways to put some of the low-quality trees to good use; but even so we certainly do not want to devote forest land to growing poor timber when much of it is capable of growing good timber.

* * *

First, it recommends continued and intensified public aid to private forestland owners. Research is an important and essential part of this aid. It should go forward vigorously, both to find answers to the immediate problems of forest and range management and users of forest products, and to expand our fundamental knowledge as a basis for new advances in forestry.

* * *

The second proposal is for public regulation of timber cutting and related forest practices. Educational work and other cooperative measures have induced many forest owners to adopt good practices. But not enough of them. The forest situation has continued to deteriorate, and the trend is still downward. The time has come for more decisive action.

* * *

A third line of action has to do with strengthening the public forests. Some thirty-five million acres of the private lands within the boundaries of existing national forests should be acquired through Federal purchase or land exchange. Considerable acreages, especially of badly depleted lands that are unlikely to be restored to productive condition by private owners, should be added to the national forests. The public interest dictates that certain critical watershed areas also be brought into public ownership.

* * *

THE NATIONAL FORESTS

Returns Greatly Exceed Costs

During the past two years, the Forest Service has been carrying on a financial-management study of the national-forest system. The study included a follow-up on previous work started in 1938 on the development of an investment budget for the national forests. These budget studies to a large degree have had the same type of approach as the recommendations of the Commission on Organization of the Executive Branch of the Government (the "Hoover Commission") in its report on the Budget.

Many of the services and benefits from national-forest management bring no direct revenue to the Government, although they represent substantial values to the public. However, an appraisal was made of the money value of certain of the nonmonetary returns from the recreation, wildlife, and water resources. The financial-management study shows that these evaluated returns plus direct cash receipts to the Government are now in excess of $400,000,000 a year. Annual costs and returns, in round figures, are as follows:

Nonmonetary returns, evaluated:	
Recreation and wildlife	$25,000,000
Water	300,000,000
Free permits for timber, range, etc.	1,000,000
Cash receipts to the Treasury	32,000,000
Other monetary returns	4,000,000
Increase in net growth and inventory revaluation	50,000,000
Total annual returns	$412,000,000
Total annual operating costs	58,000,000

These costs, in addition to including all appropriations for operating expenses, include a depreciation charge on roads and other improvements, interest on investments, and payments to the States of 25 percent of all receipts.

*

FORESTRY

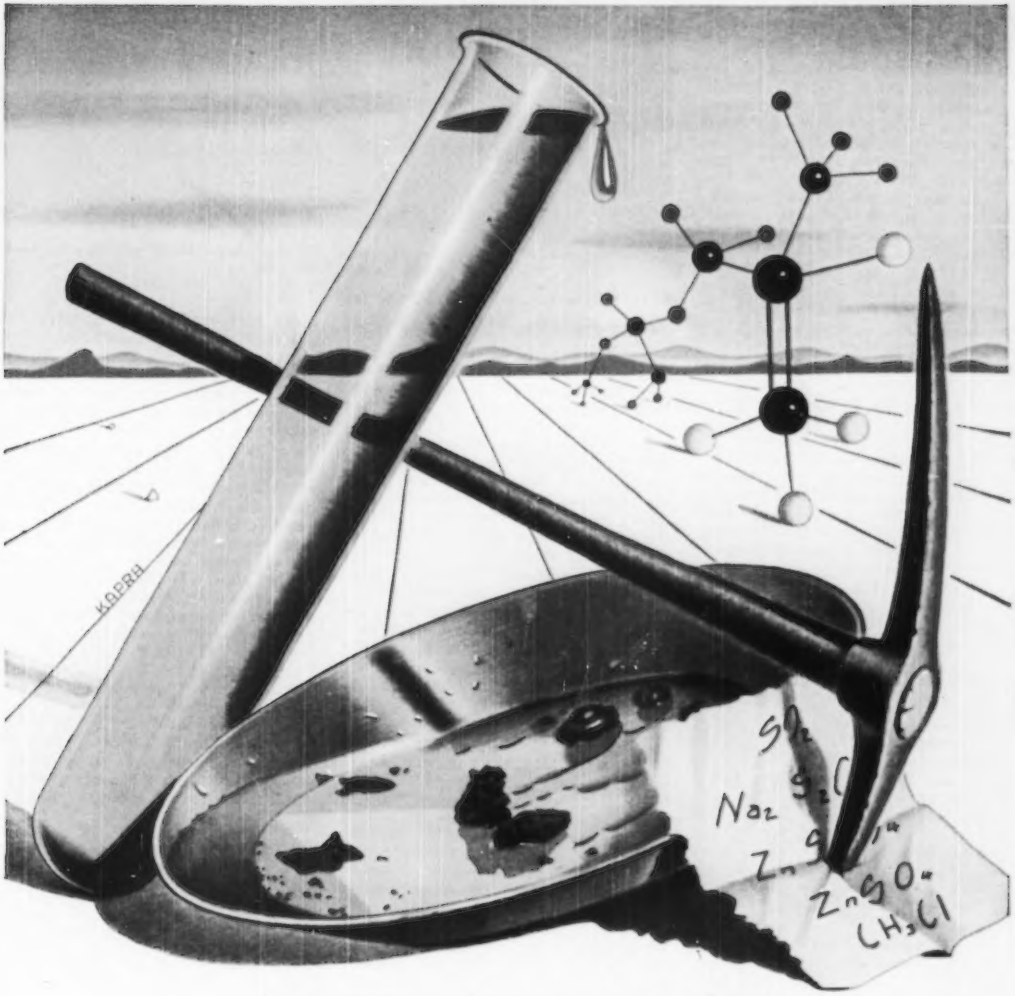
Lower Wage Scales For Woodsmen

Ottawa — Canadian paper companies are watching closely any further developments arising out of the report that the two large paper companies in Newfoundland, Bowaters Newfoundland Pulp & Paper Mills Ltd., in Corner Brook and Anglo-Newfoundland Development Company, have gained a point in their desire to obtain lower wage scales for woodsmen, with one of the four unions in Newfoundland where it represents approximately 10,000 employes agreeing to an hourly drop of 5c to a basic rate of $6.30 daily for general labor. Such wages in Newfoundland are generally higher than on the mainland.

* * *

H. H. Bennett Urges Soil Survey

Washington, D. C. — The United States is now keeping in cultivation many millions of acres that should go out of cultivation, either into permanent pasture, or quick-growing trees, H. H. Bennett, chief of the Soil Conservation Service of the Agriculture Department said this week in his annual report. He urged completion of detailed surveys to determine capability and conservation needs of the nation's farmland at the earliest possible date.



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Georgia Has Record Seedling Crop

ATLANTA, Ga. — A record crop of about 50,000,000 seedlings is the expected yield at the Georgia Forestry Commission's nurseries this season. This is an all-time high for the South, with Georgia being the leading state in tree production. This figure represents four times the output of 1947. It was made possible by the increased production at the Davisboro nursery and the expansion at the Herty and Flowery Branch nurseries.

L. C. Hart, Jr., assistant director of the commission and in charge of the nursery program, announced that the three nurseries have begun lifting and shipping seedlings to landowners. All those who have ordered and paid for the seedlings before October 20 are sure of obtaining them, he added.

The original goal of 55,000,000 seedlings set by the commission did not pan out because of the adverse weather this year. Despite spraying, disease and insects have taken their toll, wittling down the expected crop some 15,000,000. This figure may be exaggerated since there is no accurate way to judge it until the shipping season has been well under way. However, care has been taken to eliminate diseased seedlings and ship only healthy specimens.

Leads Texas Tree Farm System

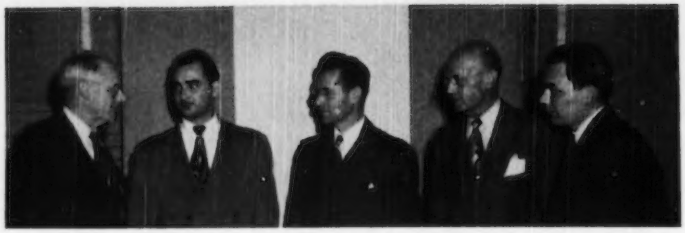
COLLEGE STATION, Tex.—After completing an inspection of 179 forest areas in the Texas Tree Farm System recently, the Texas Forest Service of the A and M College System found that Angelina county has more tree farms than any other in Texas. The 39 tree farms in this county have a total acreage of 160,182. The largest farm is that of the Angelina County Lumber Co., with 70,504 acres. The 179 tree farms are situated in 29 East Texas counties. They comprise forest areas which total 2,696,121 acres.

The inspection revealed that 12 tree farms had areas of 25 acres or less, 46 farms had from 25 to 100 acres each, 66 from 100 to 500 acres each, 37 from 500 to 10,000 acres each, 14 from 10,000 to 200,000 acres each and three tree farms were over 200,000 acres each. The smallest tree farm contains four acres and is owned by the Independent Pulpwood Producers Incorporated, Liberty county. The largest tree farm contains 683,497 acres and is operated by the Southwestern Settlement and Development Corp.

ASSOCIATIONS

Box Competition Closes Soon

The Folding Paper Box Assn. of America has called attention to the fact that entries for its 1950 Carton Competition, to be held in conjunction with its annual Meeting, will close on January 15. The Annual Meeting is scheduled to be held at the Drake Hotel, Chicago, Ill., March 22 and 23.



Left to Right—F. H. Waring, George Manos, Art Thurn, Bruce McDill and Dave Laurence at Ohio Section TAPPI Meeting.

Waring Addresses TAPPI Ohio Section

MIDDLETOWN, Ohio—F. H. Waring, Chief Engineer, Ohio Department of Health, discussed the "Legal Phases of Water Pollution Control in Ohio" before a record attendance of 144 members and guests at one of the outstanding meetings of the year at the Manchester Hotel, Middletown, Ohio, on December 8. The Health Department's Mobile-laboratory was in Middletown and open for inspection. Mr. Waring said in part:—

"State Legislation. The first legal step taken by Ohio looking toward control of water pollution took place in 1893 when the requirement was imposed upon municipalities to submit plans to the State Department of Health for any *proposed* installation of sewerage and sewage treatment works. (sec. 1240 G.C.—Amended and clarified in 1925.)

"Next in 1908 there was enacted the so-called Bense Act (Sec. 1249-1261, incl., G.C.) which provided, upon proper petition or complaint, for action by the State Department of Health comprising investigation, finding, hearing, and order for correction of water pollution resulting in nuisances damaging to public health or comfort or pollution of a public water supply. The act required proof of such insanitary conditions as might be caused by discharge of "sewage or other wastes" into the receiving waters. Findings and orders of the director of health were made subject to approval of the public health council after full hearing. Penalty for failure to obey an order might result in a $500 fine.

"Amendments to this act 1249-1261 G. C. were made in 1921 (water sections); in 1936 (legal procedures); and in 1945 (a finding and an order becomes prima facie evidence in a lawsuit for damages on account of water pollution). Constitutionality of the act has been upheld many times and many orders for pollution correction have been issued to municipalities and to industries in specific cases.

"In 1925 the original law of 1893 re-approval of plans (Sec. 1240 G. C.) was supplemented by the enactment of three sections, 1240-1, 1240-2, 1240-3 G. C. These sections were specifically directed toward water pollution control and for the first time industrial wastes were mentioned as such.

The next section, 1240-2, gives the department general supervision over the operation of such industrial wastes treatment and disposal works including sewage disposal; submission of performance records and pertinent information may be required.

"In 1949 the legislature added another section, 1240-4 G. C., re water pollution control. This section makes it unlawful for public bodies or corporations to continue to discharge from existing sewers untreated sewage or industrial wastes into the public waters of the state. Details of treatment works, including degree of treatment and time for completion of works, must be satisfactory to the director of health. The usual penalty clause of a $500 fine is provided; but there is also included the provision that "proceedings for the enforcement of the provisions of this section shall be instituted in the name of the state by the attorney general whenever requested to do so by the director of health, in the county having jurisdiction or in the county of Franklin, as provided by law."

Chicago TAPPI to Hear Leedy

CHICAGO — Dr. H. A. Leedy, Director of the Armour Research Foundation, Illinois Institute of Technology, will address the Chicago Section, of TAPPI, Monday Evening, January 16. His topic will be "New Frontiers Through Research", dealing with the general need for research in industry and covering the present wide range of research work. A 25 minute color film, entitled "Introduction to Research", will be shown. The meeting will be held at the Chicago Bar Assn., 29 S. La Salle street, beginning with dinner at 6:30 p.m.

Will Meet at Fraunces Tavern

NEW YORK — Metropolitan TAPPI will meet at Fraunces Tavern on January 10. W. C. Nusbaum of Tracer Laboratories will speak on Uses of Radio Active Isotopes.

Canadian Carloadings

OTTAWA — The Canadian Government announces cars of revenue freight loaded on the railways showed an advance to 4,378 of pulpwood and paper in the week ending December 17 as compared with 4,217 in the preceding week and 4,268 in the similar week of the previous year.

Report on the Evaporation and Burning of Calcium Base Sulphite Liquor in Scandinavia

The Investigating Committee of
The Sulphite Pulp Manufacturers' Research League, Inc.

EDITOR'S NOTE: This report made by the Investigating Committee recently returned from Scandinavia, presents the latest summary of conditions in that area.

Source of Information

Data and information, upon which this report is based, were collected during the period, November 1-December 1, 1949, largely in Sweden. The team which was selected by the Sulphite Pulp Manufacturers' League and sent to Sweden was N. L. Malcove, Technical Superintendent of the Northern Paper Mills, Green Bay, Wisconsin; F. H. Coldwell, Power Plant Engineer of the Nekoosa Edwards Paper Company, Port Edwards, Wisconsin; and J. M. Holderby, Coordinator of the Sulphite Pulp Manufacturers' Research League, Appleton, Wisconsin. This report represents the joint observations and conclusions of these men.

In Sweden 14 concerns were consulted and investigated for the information summarized in this statement. Eight of these were sulphite mills which were evaporating calcium base liquor, which is the same type of liquor produced in the sulphite pulping process used by all mills in Wisconsin. Among the other six, were the Swedish Forest Products Institute; the Swedish Steam Users Association, an organization which is the top authority on boiler design, installation, and testing in that country; and the two engineering concerns which have designed all the liquor evaporation systems in Sweden. A list of our information sources is attached as Appendix A.

Historical

Substantially all the Scandinavian experience with the evaporation of calcium base liquor has been concentrated in Sweden. No installations are evaporating calcium base liquor in Norway, but a mill at Greaaker, Norway, has a small unit of Swedish design on order and that one other Norwegian mill is experimenting with a thermo-compression apparatus.

According to all authorities contacted, Finland never has had an evaporator operating on sulphite liquor, although one mill in that country is experimenting now.

The recorded history of sulphite liquor pollution reduction efforts in Sweden started in 1901.

An elaborately baffled pond was constructed at Storvik for sedimentation, aeration and leveling off the discharge. This pond failed to materially improve the condition. After an extended period of use the pond was abandoned. The next plan was for aeration with compressed air through underwater diffusers, but excessive power costs killed this project before any installation was made.

In 1917 Storvik started the first of a series of three experimental evaporator installations which employed special designs to overcome the even then well-known tendency of calcium base liquor to scale up evaporators. These installations failed, and in 1932, apparently with Government consent, all efforts were abandoned. Since that time Storvik has disposed of its liquor by discharging it into the stream.

Thereafter until 1940 little work was done in Sweden. Then the war brought a coal shortage, rapidly raising fuel prices since most of their fuel was imported. This accelerated the drive for self-sufficiency in Sweden in respect to fuel. Most of the Swedish installations were ordered during the war when fuel was difficult to obtain and coal, when available, cost approximately $30-$40 per 2000 pound ton.

Toward 1943 some promising results were obtained utilizing new evaporating techniques. In 1943 there was installed at Hallstavik the first evaporator employing present day principles.

During the early development of the evaporators, it was apparently taken for granted that burning would present no great problem. Burning the evaporated product, therefore, received relatively little attention at that time. All of the early evaporators were small and the limited quantities of concentrate produced could usually be burned in an existing furnace without greatly affecting steam production one way or another because the amount was small in relation to the total fuel burned. Development of burners apparently started about the time the first large evaporator installations were made. However, when quantities of this new material became larger, difficulties developed.

Today neither evaporation nor burning is fully developed, although evaporating is much further along than burning. Actually, after 32 years of experimentation, only approximately 7.5% of the solids in all Sweden's sulphite liquor production is being evaporated, and only about 4.1% is being burned. The difference, 3.4%, is utilized principally for road binder. Only 5% of Sweden's roads are hard-surfaced; half of the rest are treated with sulphite liquor road binder. Evaporators are presently installed in only 9 mills out of 58, with 4 new units reported on order.

Technical Status

Evaporation and burning of calcium base spent sulphite liquor comprises four distinct steps. (1) The liquor, including solids, must be collected from the pulp mill. (2) It must be evaporated. (3) It must be burned. (4) The fly ash must be prevented from creating a nuisance.

(1) Liquor Collection

The liquor collection step is of prime importance. Pollution can be reduced by any treatment plan only to the extent that the polluting material can be recovered for treatment. But the economics of the process require that the dissolved solids be collected in as concentrated a liquor as possible to hold down the costs of boiling off the excess water.

In Sweden the sulphite mills that evaporate attempt to collect as much liquor with as high a solids content as

possible to enable them to most efficiently evaporate the excess water. Based on our observations, the Swedish mills collect from 10% to 63.5% of their dissolved solids, and average about 45.5%.

The degree of pollution reduction being accomplished in Sweden is about 12½% less of the above figures because some of the oxygen-demanding constituents of sulphite liquor are volatile. Most of these will be boiled off in the process, condensed with water, and routed to the stream as evaporator waste. A reasonable estimate of the degree of reduction being accomplished by the mills in Sweden varies from 9% to 56%, and averages about 40%.

Swedish mills generally collect liquor by draining and subsequently washing the pulp while still in the digester. Washing is usually carried out on a countercurrent principle. Removal of pulp from the digester, following washing, is accomplished by sluicing with high-pressure water from a hand manipulated hose. This method ties up the digesters for a total cycle of 16 to 24 hours per cook as contrasted with many Wisconsin mills' practice of approximately 8 hours per cook. Swedish mills have ample digester capacity and some mills even have excess digester capacity, so that this method does not hamper their production. Only one mill visited was noted to be blowing the digester charge into a conventional blowpit.

Swedish mills use the procedure outlined in order to attain concentrations in the collected liquor of from 9% to 14%. Other steps generally employed there toward the same end included intensive chip packing, the use of hot acid accumulators, and mechanical circulation in the digesters to permit withdrawal of varying quantities of cooking acid after the chips are penetrated. Digester cycles are necessarily lengthened materially as a result. Most Swedish mills have no blowpits. It is believed that Wisconsin mills having blowpits can equal the Swedish practice in liquor collection.

(2) Evaporation

Spent sulphite liquor is evaporated to change a relatively dilute solution of dissolved wood solids to a more concentrated solution by removing some of the water. Evaporation does not reduce the pollutional character of the materials. It merely concentrates the solution so that in its concentrated form the liquor may be burned.

The principal technical problems have been corrosion and scaling. The development of stainless steels has taken care of corrosion. The scaling problem is well on the way toward solution by two systems which are in use in Sweden today.

These two systems approach the scaling problem from quite different angles. Ramen attempts to prevent scale formation by employing high velocities in the evaporator heaters and by a "heat shock" treatment to precipitate most of the scaling substances.

Rosenblad allows scale to form in a normal manner and removes it periodically before it attains a thickness sufficient to interfere with the functioning of the evaporator.

Rather than the familiar "Shell and tube" construction, both systems utilize a plate design in the heaters which results in low friction characteristics. This permits Ramen to accomplish forced circulation with a minimum of power consumption. In Rosenblad's design it permits thermo-circulation of liquor in concentrations up to approximately 60% solids. Even more important to Rosenblad, the plate design lends itself to a periodic switching of the steam and liquor channels. This switching presents a scale-free surface to the liquor and results in the solution and removal from the system, by the steam condensate, of such scale as has been laid down from the liquor during the previous cycle.

(3) Burning

Burning concentrated spent sulphite liquor, in Sweden, has lagged far behind the development of evaporation. The thought in Sweden was first to overcome the evaporation problems before seriously attacking the burning and fly ash problems. Little difficulty in burning concentrated liquor was expected, but burning proved to be a serious problem. As yet the Swedes are far from a satisfactory solution.

Three of the mills which concentrate liquor are using all of the concentrate for road binder. Of the other six mills, two are burning their concentrate. The remaining four mills are burning part of their concentrate and using the rest for road binder and a small volume for chemical products. All mills which burn sulphite liquor are doing it in existing boilers with auxiliary fuels such as wood refuse, coal, oil, or a combination of these.

Attempts at burning the dry powder have failed completely because of the powder caking on the boiler tubes. The current attempt is to burn 50% liquor by atomizing the liquor into the furnace mechanically. Control of pressure and temperature is critical.

Atomizing devices range in size from 1000 pounds per hour of 50% liquor to 2200 pounds per hour. Since the largest of these burners can produce only a theoretical output of around 7500 pounds of steam per hour, many burners must be used in a sizable steam-producing unit. The number and size of burning units varies widely.

Burning wet liquor by flash drying was attempted in one unit. An extended furnace of very small size was fired with oil to provide heat which almost dried the liquor which was injected into it. Secondary air was admitted after drying, and combustion took place in a turbulent burner similar to pulverized coal burners. This system is highly sensitive to temperature changes in the extended furnace, as well as changes in velocity of the hot gases produced by the burning oil. It operated for about a month and then shut down permanently.

So far two boilers have been designed specifically to burn concentrated sulphite liquor in conjunction with other fuels. The first was tried out on burning only 10% of its fuel as concentrated sulphite liquor and failed to operate successfully and for the time being the company abandoned it. The second installation has not been tried out because the necessary evaporators have not yet been installed.

A great deal of experimentation is still necessary before it will be possible to burn concentrated liquor successfully and continually. Although Swedish experience points out some of the pitfalls, the problem of burning is far from being solved.

(4) Fly Ash

Spent sulphite liquor as a fuel is relatively low in heating value and high in ash content. When completely burned, it produces a light colored fluffy ash, most of which goes up the stack. Unless this ash is removed from the flue gas before emission, it invariably deposits dust over all the neighborhood. Whether this constitutes a nuisance of greater or less degree depends on the surrounding territory. Most Swedish mills burning concentrated liquor are near large bodies of water and in sparsely populated areas.

Two of the Swedish mills use water scrubbers to remove fly ash from the flue gases. One of these mills pumps the recovered fly ash to the stream, while the other mill pumps the fly ash to a swamp from which the ash eventually must find its way to the stream. Other Swedish mills that burn concentrated liquor utilize a dynamic filter somewhat similar to the mechanical precipitators in use in the United States for the removal of similar material. Apparently, no efficiency tests have been run on sulphite liquor fly ash collectors. Opinions have been expressed that their efficiency is not very high and that their performance ranges between 60% and 70% in collection of fly ash. New designs are being planned in Sweden with the hope of increasing this figure.

SUMMARY

(1) Evaporation and burning of calcium base sulphite liquor in Scandinavia has been almost exclusively confined to one country, Sweden.

(2) Sweden has been working on the problem since about 1917, although the period of concentrated effort dates only from the advent of World War II.

(3) Liquor collection practices in Sweden aim at efficient evaporation results and collect an average of 45.5% of the solids in the spent sulphite liquor.

(4) Evaporation techniques have been developed which appear capable of overcoming the more important operational obstacles.

(5) Development of burning techniques has lagged considerably

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Fig. 1944—Large 150-pound Stainless Steel "Y" Valve with flanged ends, bolted flanged yoke-bonnet and outside screw rising stem. Sizes 2½" to 12", inclusive.

Fig. 559—125-pound Iron Body Bronze Mounted Swing Check Valve with flanged ends, bolted flanged cap and regrindable, renewable bronze seat and disc. Disc, when wide open, permits full, unobstructed flow through valve body.

Fig. 708—200-pound Bronze Globe Valve with screwed ends, union bonnet, renewable, specially heat treated stainless steel seat and regrindable, renewable, wear-resisting "Powellium" nickel-bronze disc.

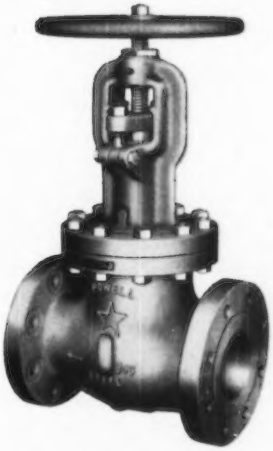

Fig. 3031—Class 300-pound Cast Steel Globe Valve. Has flanged ends, bolted flanged yoke and outside screw rising stem.

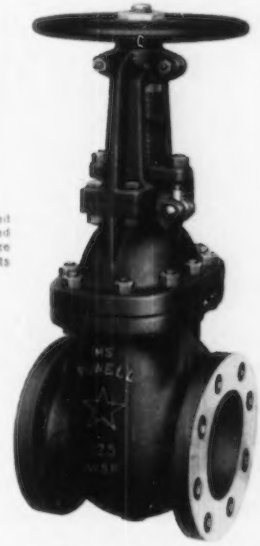

Fig. 1893—Flanged end Gate Valve designed and developed especially for Paper Mill service. Body, bonnet and yoke are cast of 3% Nickel Iron; screwed-in seat rings are 18-8 SMo; solid wedge is made of Ni-resist.

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behind evaporation, with the result that sound principles for burning this material in quantity are not currently known.

(6) Fly ash from the burning of sulphite liquor is recognized as a serious problem.

(7) At present only about 7.5% of the calcium base sulphite liquor produced in Sweden is being evaporated and only approximately 4.1% of the solids are being burned.

(8) Attached hereto in Appendix A is a list of the mills visited and the persons consulted. It is felt that the best informed people in Sweden on the subject were consulted.

(9) The trip to Sweden was very much worthwhile as it provided first hand information on the Swedish accomplishments as well as their difficulties. It was also of importance that we obtained their general thinking and future planning based on their experiences, something that is practically unattainable through corresponding.

(10) In order to transpose Swedish practice on evaporation and burning to Wisconsin conditions, the following points must be given consideration:

(a) *Collection System*

No Wisconsin mill has sufficient digester capacity to drain, wash and sluice out the pulp from the digester in the Swedish way. The Swedish method ties up the digesters for a long time; thus, using it would seriously curtail pulp production as well as greatly increase the cost of manufacture for the Wisconsin mills. The alternative is to attempt to obtain an amount of liquor solids equivalent to the Swedish practice by utilizing the blowpits.

(b) *Evaporation*

Swedish evaporation practices are reasonably advanced. The conditions for each contemplated installation in Wisconsin would have to be studied and specifically designed. In due course most operational obstacles should be overcome.

(c) *Burning*

Continuous burning of concentrated liquor is still an unsolved problem, and it will take intensive effort to overcome the major obstacles. Experiments in this field are now being carried on with concentrated liquor from the League's pilot evaporation plant at Appleton, in cooperation with the leading American boiler manufacturers. This phase will be time-consuming. To achieve a reasonable reduction in stream pollution by evaporation and burning, it is essential that the mill be capable of burning whatever liquor is evaporated, continuously and with little interruption.

(d) *Fly Ash*

Swedish fly ash collection efficiencies are not very high and are so recognized by their authorities. The sulphite mills in Wisconsin and particularly on the Fox River are in communities much larger than Swedish mill towns. It is doubtful if Swedish fly ash removal practices would satisfy Wisconsin communities. Developing an efficient fly ash remover is as important as any of the other steps. It would be futile to carry the first three steps to a reasonable solution and then find that the fly ash problem remained unsolved.

(11) The problems of disposing of a quantity of spent sulphite liquor by the evaporation and burning process are not insurmountable, but it will take time and concentrated effort to overcome, to the degree attained in Sweden, the the problems that still exist.

APPENDIX A

MILLS VISITED AND PERSONS INTERVIEWED

Calcium Base Sulphite Mills with Evaporators

(1) Sulfite A.B.; *Göta*
G. Savö, Chief Engineer

(2) Bengtsfors Sulfite A.B.; *Bengtsfors*
Otto Knuts, Managing Director

(3) Billeruds A.B.; Slottsbron Bruk; *Slottsbron*
Herman Vogt, Manager
Odd Möller, Engineer

(4) Mölnbaka Trysil A.B.; *Forshaga*
H. Hedberg, Engineer, A.B. Ramen's Patenter

(5) Storar Kopparbergs Berslags A.B.; Kvarnsveden Pappers bruk; *Borlänge*
Oscar Linde, Superintendent

(6) Holmens Bruks och Fabriks A.B.; Loddby Bruk; *Aby*
Otto Anderzen, Manager

(7) Hallsta Bruk; *Hallstavik*
Lars Ekelund, Manager

(8) Wargöns A.B.; *Wargön*
Axel Benton, Chief Engineer

Others

(1) Mellersta och Norra Sveriges Angpannaförening; *Stockholm*
G. Edling, Director
B. Brunes, Engineer

(2) A.B. Ramen's Patenter; *Stockholm*
T. Ramen, Chief Engineer
C. Magnusson, Engineer

(3) Stora Kopparbergs Berslags A.B.; *Skutskär*
Dr. Ragnar Söderquist, Manager

(4) Storvik Sulfitfabrik A.B.; *Hammarsby*
M. Rudberg, Manager

(5) Svenska Träforskinings Institute; *Stockholm*
Dr. Erick Hägglund
Professor Börje Steenberg
Engineer Axel Schalander
Engineer Lennart Stockman

(6) A.B. Rosenblads Patenter; *Stockholm*
C. Rosenblad, Manager
A. Ahlström, Assistant Manager
C. Nyman, Civil Engineer
N. Eklöw, Civil Engineer

(7) Chalmers Teku Högskol; *Göteborg*
Professor Olof Samuelson

MEETINGS

ASSOCIATION EXECUTIVES: Please send us your meeting dates and locations for this column as far in advance as possible. No charge for publication.

1950

JANUARY 10: Lake States Section of TAPPI, 6:30 p.m., American Legion Club House, Appleton, Wisc.

JANUARY 18-20: American Management Assn., General Management, St. Francis, San Francisco, Calif.

JANUARY 25-27: Canadian Pulp & Paper Assn., 1950 Annual Meeting, Technical Section, Mount Royal Hotel, Montreal. For detail write to Douglas Jones, Sec.-Engnr., Technical Sec., C.P.P.A.

JANUARY 26: American Pulp & Paper Mill Superintendents Assn., Miami Valley Div., Hotel Anthony Wayne, Hamilton, Ohio.

FEBRUARY 5: National Association of Waste Material Dealers, Inc., Mid-Western Div., Stevens Hotel, Chicago, Ill.

FEBRUARY 13-15: American Management Assn., Personnel Div., Palmer House, Chicago, Ill.

FEBRUARY 19-25: A.P.P.A., Annual Meeting, Waldorf-Astoria, New York City. For details write to E. W. Tinker, Exec.-Sec., 122 East 42nd St., New York 17, N. Y.

FEBRUARY 20-22: National Council for Stream Improvement, Annual Meetings, Waldorf-Astoria, New York City.

FEBRUARY 20-24: Technical Assn. of the Pulp & Paper Industry, Annual Meeting, Hotel Commodore, New York City.

FEBRUARY 21: Massachusetts Institute of Technology Alumni, Annual Luncheon, Engineer's Club, 32 West 40th St., N.Y.C. (in connection with TAPPI Convention).

FEBRUARY 21: SAPI Luncheon, Hotel Waldorf-Astoria, New York City. For details, write to E. G. Amos, Sec.-Treas., Salesmen's Association of the Paper Industry, 122 E. 42nd St., New York 17, N. Y.

FEBRUARY 22: University of Maine Annual Luncheon, Hotel Commodore, South Room, New York City.

FEBRUARY 23: A.P.P.A. Dinner, Annual Meeting, Waldorf-Astoria, New York City. For details write to E. W. Tinker, Exec-Sec., 122 E. 42nd St., New York 17, N. Y.

FEBRUARY 26-MARCH 1: American Institute of Chemical Engineers, Regional Meeting, Rice Hotel, Houston, Texas.

FEBRUARY 27-MARCH 3: American Society for Testing Materials, Committee Week & Spring Meeting, Hotel William Penn, Pittsburgh, Pa.

MARCH 6-10: Fourth Annual Conference, Australian Pulp & Paper Industry, Technical Association.

MARCH 13-15: National Assn. of Waste Material Dealers, Inc., 37th Annual Convention, Waldorf-Astoria, New York City.

MARCH 15-17: American Management Assn., Marketing Div., Hotel Statler, New York City.

MARCH 27-29: National Paper Trade Assn., Annual Convention, Hotel Waldorf-Astoria, New York City.

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SUPPLIERS

United States Rubber Co. has purchased the chemicals division of The Glenn L. Martin Co., according to a joint announcement by the two concerns. The rubber company will acquire all assets of the division, including the Marvinol vinyl resin plant at Painesville, Ohio, laboratory equipment in Baltimore, patents and the trade name Marvinol. The purchase price was not announced.

The business will become a part of the Naugatuck Chemical division of the rubber company. The Painesville plant will continue to make Marvinol vinyl resin for sale to manufacturers of plastic products. United States Rubber Co. said the purchase is part of a long-range program to expand its activities in the chemical field.

The plant at Painesville, built in 1947, currently employs about 200 persons, with a monthly payroll of $50,000. Consisting of nine buildings, it is the third largest vinyl plant in the country, and the most modern of its type. It is close to raw material sources and has good rail, highway and water transportation facilities. The present management at Painesville will continue in charge. Employes on the Martin payroll will be transferred to the rubber company's payroll at the end of the year, it was announced. The operation includes about 65 employes in Baltimore connected with research and development, sales and technical service. It is planned to transfer Baltimore personnel to the Naugatuck Chemical plant, Naugatuck, Conn., next year.

B. F. Goodrich Co.'s president, John L. Collyer, was made a Chevalier of the Legion of Honor by the French Republic, at a simple ceremony held at company headquarters in Akron, Ohio.

Presentation of the citation was made by J. J. Viala, Consul-General of France. In announcing the decree issued by the President of the French Republic, Henri Bonnet, French Ambassador to the United States, issued the following statement: "This highly-deserved distinction granted to Mr. Collyer by the French Government is a token of the gratitude for the services he rendered to the Allied cause, during the war, and to French industry in its period of reconstruction, especially by the encouragement he gave to the closest cooperation between French and American technicians."

In December, 1946, on executive order of the President of the United States the B. F. Goodrich president was awarded the Medal for Merit for "foresight, ability and energy in the development and execution of a program to provide the armed forces and the country with the rubber products needed in the war effort."

Brown Instruments Division of Minneapolis-Honeywell Regulator Co. reports its industrial instrumentation training school schedules to be conducted for the first six months of 1950 will include four short courses of five weeks each and one long course of 13 weeks. The regular comprehensive 13-week course will start on February 27 and will end on May 26. In this, and in the shorter courses, lecture and bench instruction will take up new and improved types of industrial measuring, indicating and controlling instruments. These will include millivoltmeter-type pyrometers, continuous balance potentiometers, electrically-operated automatic control, flow meters, thermometers, pressure gauges, hygrometers, air-operated automatic control, Moist-o-Graphs, tachometers, resistance thermometer—CO_2 and analygraph.

Graver Water Conditioning Co., manufacturer of equipment for all water treatment processes, announces the appointment of Brookman-Kron Associates as its sales engineering representative in the Buffalo, N. Y., territory, with headquarters at 259 Delaware avenue, Buffalo 2, N. Y. Brookman-Kron Associates is headed by Roger R. Brookman and E. Philip Kron, both of whom have had extensive experience in the engineering and sales of industrial equipment throughout the Buffalo territory. The Graver main office is at 216 W. 14 street, New York 11, N. Y.

Combustion Engineering-Superheater, Inc., reports that Arthur Hunter, formerly assistant manager of the Philadelphia office, has been transferred to New York as assistant general sales manager. Robert L. Riker, formerly manager of the Proposition department, New York, has been made an assistant general sales manager. G. P. Ellis, formerly western manager, has been made manager of the Washington, D. C., office. T. J. McGowan has been transferred from the Washington, D. C., office to Philadelphia.

Market Study

A 48 page market study of the pulp, paper and paperboard industries, prepared for the use of sales managers, advertising directors, advertising agency research, account and space executives, is now available from the Lockwood Trade Journal Company—publishers of Paper Trade Journal.

Market information unavailable anywhere else, product consumption figures, actual mill expenditures and maps of great importance to sales departments, are all part of this book.

While we want everyone who needs this booklet to have a copy, we are forced (because of its limited edition) to restrict its distribution to those who are interested enough to mail an identifying request to Dept. W. W. W., Paper Trade Journal, New York, 19, N. Y.

New Defibering and Deinking Machine

ALBANY, N. Y.—A New Jersey inventor and an Albany businessman have hopes a new paper-making machine may lead to a new industry in Albany. The machine is a revolving drum which de-fibres pulp and de-inks used paper for reuse in a much shorter time and more effectively than the vat method now used in paper mills, its sponsors claim.

The inventor of the machine, John C. Lowe, Finesville, N. J., has formed the Lowe Paper Machinery Corp., with Joseph W. Connelly, 2 Grand street, of the George F. Mahar Produce Co., to manufacture and sell the machines in Albany. Mr. Connelly said one large machine, worth $18,500, has been bought and is in use at the Manhattan Paper & Pulp Co., Hudson Falls, N. Y., and another smaller model was sold to the Cellulose Fibre plant in Holyoke, Mass., after demonstration there. The firm also plans to show the machine to the APW Products Co., in Albany and other paper concerns.

Office space is being sought in Albany and if the machine goes over, the firm plans to rent or build a factory to produce it in that city next Spring. Mr. Lowe has been in the paper business many years and is reported to have invented another machine for which a patent is pending.

INGRAHAM GOES TO MAIN

Harold G. Ingraham, formerly chief engineer for the Bird Machine Co., South Walpole, Mass., has joined the staff of Chas. T. Main, Inc. of Boston in their Pulp and Paper Mill division. Mr. Ingraham was formerly with the late V. D. Simons, consulting engineer of Chicago, and was responsible for the designing of many paper mill projects both in the middle west and on the Pacific Coast. He had been with Bird for eighteen years.

TRUNDLE EXECUTIVE APPOINTMENTS

HARRY L. WOOD

The Trundle Engineering Co., Cleveland, Ohio announced that Creed W. Fulton has been elected a vice-president and named manager of the company's New York Office, at 420 Lexington Avenue. He was formerly vice-president of Samuel J. Creswell Iron Works, Philadelphia, fabricators of iron and steel and producers of gray iron castings. Harry L. Wood, vice-president of the Trundle organization since 1941, will head its Chicago Office, 208 South La Salle Street.

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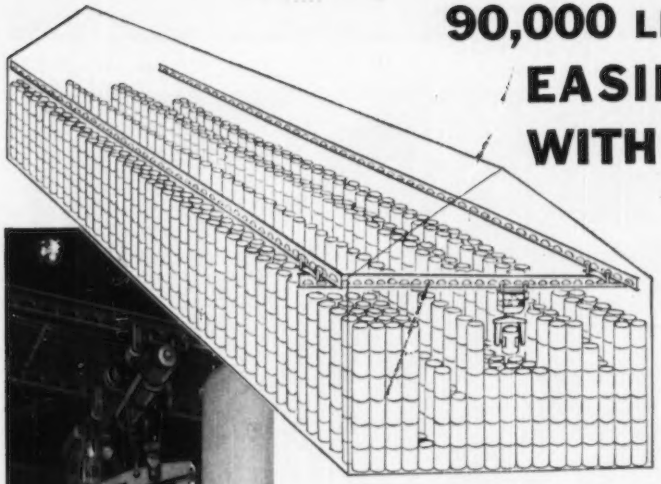

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OVERHEAD MATERIALS HANDLING EQUIPMENT

Production of Tall Oil in Finland

By

V. V. JUVONEN

Enso-Gutzeit Osakeyhtio, Kotka, Suomi, Finland

Tall Oil is the name given to a material containing mainly fats and resins which is obtained as a by-product in the sulphate cellulose industry. The fatty and resin matter of the wood dissolves in the alkali liquor in the digester and subsequently separates on standing in special towers on the surface of the liquor as a so-called crude soap. This crude soap is then treated with ordinary sulphuric acid, whereupon the dark-coloured crude tall oil separates.

Before the war the yields of crude tall oil in the cellulose works in this country averaged about 20 kg per ton of cellulose. Conditions resulting from the hostilities led to an advance in the right direction and the yield of tall oil has increased manifold. In Sweden yields exceeding 90 kg/ton have been obtained and in one of our factories the yield has risen to over 70 kg. The literature mentions that the fat and resin content of pine wood is approximately 6% (Hägglund: Holzchemie). This corresponds to 130 kg of tall oil per ton of Cellulose. Accordingly the yields obtained in Sweden and in our country amount to approximately 70% and 50%, respectively, of the theoretically possible. It has been observed, however, that the tall oil depends to a large degree upon the wood used as raw material. Of primary importance in this respect is the duration of storage of the wood before use. Immediately after felling of the tree, a small part of the fats and resins of the wood have been found to be oxidized to hydroxy-compounds, which do not separate under the usual conditions as a soap from the used sulphate digestion liquor. Rapid oxidation occurs while the wood is being stored in open air. This oxidation proceeds much more slowly in wood stored under water. In view of the quality of the tall oil this change in the wood during storage is harmful in that the most valuable portion, the fatty matter, is more easily oxidized than the resins. Investigations carried out by the Swedes have revealed that about 23% of the fats and resins have oxidized while the wood has been stored for one month in open air, whereas the percentage oxidized during a period of 2½ months under water was approximately 5%. It should be mentioned that according to these investigations the percentage of fats and resins in newly-felled pine was only around 4%, which corresponds to about 90 kg tall oil per ton of cellulose. Hence it may be noted that the afore-mentioned tall oil yields are practically the maximum obtainable. The reasons why these yields have not been attained in all factories are to a large extent easy to understand. The digestion liquors are calcined in the sulphate factories in specially constructed recovery furnaces and the heat energy thus obtained is used for the production of steam and the remaining alkali salts are used in the preparation of new digestion liquor. A well operated soda department is thus able to produce all the steam the factory requires. In addition to the fact that the heat value of the crude soap is high, the presence of the soap facilitates to a certain degree the operation of the recovery furnace. It seems possible, however, that cheaper fuel may be substituted for the crude soap. At present the cost of fuel is about 4½ marks per kilo, as compared with the price of 8½ marks per kilo of tall oil. When the cost of separation of the tall oil is taken into account the situation is such that cheaper fuels than tall oil may be utilized. In the first place this requires a decision on the best type of recovery furnace. In this country several sulphate pulp mills use considerable quantities of wood from saw mills. This surface wood gives a tall oil containing a higher proportion of fats than ordinary round stock, but the yields are smaller. During the war when tall oil was required in large quantities each pulp mill was assigned a definite tall oil percentage minimum which it was required to maintain. In this respect the mills situated in Northern Finland were given the highest assignment, those of Central Finland a lower one, and those of Southern Finland only approximately 71% of the highest assignment. This was based on the supposed fat and resin contents of the spruce wood: Northern Finland 63 kg/ton, Central Finland 54 kg/ton and Southern Finland 45 kg/ton.

Numerous analysis of the crude tall oil from different mills have been annually performed in the control laboratory at Kotka. Examples of these are given in *Tables I* and *II*.

Table I
Tall Oil from Round Stock

	Resin acids	Fatty acids	Unsaponifiable matter
Kemi	56.9%	29.1%	11.1%
Kaukopää	59.4%	31.5%	9.5%
Sunila	53.5%	36.0%	8.8%
Kehra (Esthonia)	55.4%	34.7%	8.8%
Gutzeit (Kotka)	51.6%	33.3%	9.4%

No clear differences in the resin contents between Southern and Northern Finland are here observable. The tall oil obtained from the saw-mill residues has, however, a definitely higher fat percentage.

Table II
Tall Oil from Saw Mill Waste

	Resin acids	Fatty acids	Unsaponifiable matter
Halla	38.7%	52.0%	8.8%
Halla	39.0%	54.4%	7.5%
Kaukas	31.7%	62.3%	4.8%
Enso	34.9%	58.1%	6.1%
Rosenlew	38.0%	49.4%	12.4%
Gutzeit (Kotka)	30.1%	62.0%	6.3%

The value of crude tall oil is directly proportional to the fatty acid content. Neither should the crude tall oil contain too much unsaponifiable matter. England, for instance does not accept at present tall oil containing more than 10%. This proportion of unsaponifiable matters appears to vary with the quality of the raw material and also with the method used to free the oil from the crude soap. Reliable experimental values concerning this cannot yet be given. According to investigations from Sweden the duration of storage does not substantially affect the proportion of unsaponifiable matter. In connection with the yield and quality of the tall oil it may also be mentioned that the amount of tall oil obtained from spruce wood is only about 20-25% of that obtained from pine wood. The fat percentage of the former is from 8 to 10% higher than that of the latter.

In Finland Hellstrom began his investigations of tall oil in 1911 and in the Baltic exhibition at Malmo in 1914 distilled tall oil and soap was displayed.

Due to the first world war, commercial scale distillation of tall oil was not begun until 1920. Even today the procedure in use in Kotka is mainly the same as then, although the distillation facilities have been enlarged and improved.

At our plant in Kotka the tall oil is fractionated at about 15-20 mm pressure using steam superheated to 250-280°C. The resin content of the tall oil is 35-38%. For special purposes two different grades of tall oil are produced, one containing a resin percentage of 25-30% and the other about 20-25%. In addition pine resin is obtained by crystallization, an initial fraction suitable for use as a chill oil is taken as well as a fraction rich in palmitic acid containing approximately 70% solid fatty acids and only 2-3% resin. The distillation residue is termed tall oil pitch.

An average distillation in the ap-

paratus designed by Hellstrom gives the yields shown in *Table III*.

Table III

Chill oil	0.8%
Palmitic acid fraction	0.7%
Special grade of tall oil	4.0%
Ordinary tall oil	47.0%
Tall resin	14.0%
Tall oil pitch	30.0%
Loss	3.5%

Table IV shows a comparison of the analysis of the Swedish (Sandarne) and Finnish distilled tall oil.

Table IV

	Sandarne I	Sandarne II	Ordinary	Gutzeit Kotka Spec. I	Gutzeit Kotka Spec. II
Resin acids	9.4%	23.0%	36%	24%	20%
Fatty acids	80.9%	70.7%	56%	68%	72%
Unsaponifiable	9.5%	6.1%	8%	8%	8%

The analysis of the tall oil pitch is as follows:

Insoluble in petrolether	22.0%
Unsaponifiable	24.8%
Resin acids	18.5%
Fatty acids	33.0%
Ash	0.4%

It may be noted from the analyses in the various tables that the principal constituents of tall oil are three groups of organic substances: unsaponifiable matter, resin acids and fatty acids.

The nature of unsaponifiable matter is as yet very little known. Sterines belonging to the phytosterine group have been separated from crude tall oil as well as lignocetine alcohol $C_{24}H_{49}OH$, which crystallizes out with the former. From the distilled tall oil acetovanillone has been separated. The unsaponifiable matter in the distilled tall oil is objectionable and all means are taken to avoid its presence. The earlier fractions of tall oil contain about 30% unsaponifiable matter and this cannot be used for the same purpose as ordinary distilled tall oil. The major part of the unsaponifiable matter is perhaps formed by decomposition products of fats and resins, hydrocarbons, etc.

Crude tall oil contains from 3 to 5% sterols which are different isomeric stigmasterols ($C_{29}H_{50}O$). They were formerly considered good emulsifiers but now they are important raw materials in the production of hormones (androsterone).

The resins acids of the tall oil are known through the investigations made by W. Sandermann. He found these to be composed of about 25% dextropimaric acid, about 50% abietic acid and about 25% pyroabietic acid. Ordinary rosin or colophony differs from this resin in that it does not contain any pyroabietic acid and only 15% abietic acid. On the other hand it contains 55% proabietic acids and 5% laevopimaric acid. The two latter acids change on heating into abietic acid and further into pyroabietic acid. When the conditions leading to the separation of the tall oil resins are considered, it is easy to understand these changes in structure: first at 160°C. for two to three hours in the cellulose digester, then at 270°C for about 6 hours in the distillation vessel and when the resin is finally crystallized from the distilled tall oil and centrifuged, the conditions have been much "hotter" than those under which the resins are separated from the colophony. The distilled and crystallized tall oil resin product is considerably more pure than the ordinary colophony grades. Analyses performed in our control laboratory give the results shown in *Table V*.

The relative colour has been determined by comparison with the colours of 0,1—normal iodine solution. The large ash content of the fused tall oil resin is due to soda, which has been added to it before fusion. Due to the structural changes mentioned above and its purity, the melting point of the tall oil resin is 155°C, which is considerably higher than that of colophony. In addition it is more easily crystallized than ordinary colophony. The properties have given much trouble in paper mills where it has been attempted to prepare sizing from tall oil resin by melting it first. The sizing properties of tall oil resin are as good as those of ordinary colophony, but adhesives made from it are not as good as those made from lower melting rosins. For use in paper and cardboard factories the crystalline tall oil resin is melted and cast into paper bags. To prevent recrystallization 2 to 3% soda is added before melting. This causes no difficulty in the sizing of paper as soda is always added to the rosin when it is prepared for this purpose. The pyroabietic acid in the resin gives it many good properties. This acid as well as dextropimaric acid oxidize less easily than the other resins acids mentioned above. It has been possible to show approximately that a paper sized with tall oil resins has a lesser tendency to become yellow than paper sized with ordinary rosin under the same conditions.

Tall oil resin is used in this country as a raw material both in the paper industry and in the lacquer and soap factories.

Table V

	Resin acids %	Fatty acids %	Unsaponifiable %	Insoluble in petrol ether %	Ash %	Volatile matter %	Relative colour %
Crystallized tall oil	94.7	4.8	0.4	0.04	0.07	0	0.4
Fused tall oil resin	90.9	4.9	0.7	1.5	2.66	0	0.4
Fused tall oil resin	91.6	5.0	2.1	0.4	2.70	0	1.3
Portuguese rosin FF	76.2	2.9	5.2	14.6	0.07	0.59	0.9
American rosin H	85.8	1.6	6.4	4.7	0.11	0.06	1.4
German rosin N	76.1	4.2	9.4	9.3	0.05	0.46	0.9
Rosin of unknown origin F	71.5	4.1	4.4	19.2	0.02	0.49	4.2

The most valuable portions of the tall oil are the fatty acids. Their percentages vary but the approximate values are shown in *table VI*.

Table VI

Saturated solid fatty acids	5-11%
Oleic acids	40-42%
Linoleic acid	41-48%
Linolinic acid	6-8 %

The major portion of the solid acids is palmitic but also stearic, carnauba, myristic, sebacic and adipic acids have been isolated.

Ordinary distilled tall oil contains all these acids. By distillation it is possible to obtain a fraction which does not contain solid saturated fatty acids and is hence better adapted for use as a raw material in the lacquer and varnish industry.

Up to the present the quantitative separation of the resin and fatty acids of tall oil has not been attained in Europe on a technical scale. Tall oil containing resins is, however, a valuable raw product. Many industries, such as for example, the soap, lacquer and varnish industries, use fats and resin together. These two industries use almost the whole of our output.

The annual production of sulphate cellulose in this country is at the best about 550,000 tons (1938—562,000 tons). If we suppose that 40 kg of tall oil is obtainable per ton of cellulose, which is a conservative average, we should be able to obtain annually 22,000 tons of crude tall oil. Unfortunately we are not able to refine the whole amount domestically. At Kotka we can distil about 12,000 tons and at Oulu about 3,500 tons. But when the distillation plants at Kemi and Oulu begin production the value of tall oil as a domestic raw material for a chemical industry will be appreciated.

Although tall oil has been distilled in this country for almost thirty years, the refinement of tall oil has made little progress during this time. The Gutzeit Company originally intended to sell the distilled tall oil to the soap industry. The product was not accepted on the market, for which reason the Company began to make tall oil soap, and has found no reason to regret this step. Hardly any better use for this distilled tall oil than the production of a household soap can be de-

vised. Before the World War II distilled tall oil was very little used for other purposes except for some of an experimental nature. Many thousands of tons were exported annually, however, while at the same time other corresponding raw materials were imported. During, and especially after, World War II a number of mills have found that tall oil is suitable for many purposes, for which raw material was formerly imported.

Only during and after the war did our scientists find interest in tall oil. The Central Laboratory in Helsingfors has carried out important investigations during the last two years. And also our other higher institutions of learning have noted that it offers a wide field with numerous opportunities for investigators.

The practical methods of analysis of Tall Oil, now in use, are too inaccurate. One inaccuracy I may mention that instead of speaking of unsaponifiable matter, one should say neutral matter soluble in petroleum ether. The potentiometric determination of resin acids is a welcome method. It should be pointed out, however, that the substance contained in the tall oil can be accurately determined, but the methods in use are so complicated that it is impossible for any ordinary unskilled laboratory worker to perform an analysis in any reasonable time, if at all. The Central Laboratory has succeeded in overcoming some of these analytical problems.

It is the duty of analytical chemists to devise simple but sufficiently accurate methods of analysis. Then follows the problem of the cellulose chemist to determine how the tall oil can be separated as well as possible from black liquor and also how pulp wood should be handled to avoid unnecessary deterioration of this valuable by-product. An economic method of separating the phytosterine from the tall oil as well as a method of eliminating worthless neutral substances from the tall oil should then be developed. After this the tall oil may be refined in a number of ways. By distillation an oil suitable for the manufacture of tall oil soap and other soaps and also crystalline or fused resin may be obtained. For the soap industry a more solid fat may be obtained by hydrogenation. For soap a slight hydrogenation of the linolenic and linolic acid suffices and the product is solid enough, odourless and superior in washing properties to pure stearic acid, which is the final hydrogenation product of tall oil fats. At the University of Helsinki, experiments have also been conducted to effect a polymerization of tall oil but it seems that the polymerized fatty acids obtained are inferior to the hydrogenated acids as soap raw materials. The annual per capita consumption of soap in Finland may be estimated in normal times not to exceed 3 kg., or 12,000 tons total. Since tall oil even in the hydrogenated form cannot be substituted for the entire soap fat content, we may suppose that the soap industry can use a maximum of about 6,000 tons per year. Although there is good reason to believe that the export of distilled tall oil will continue, the soap industry cannot be expected to use all of the tall oil remaining. It would appear natural in this case to separate the different fatty acids so that the unsaturated acids can be used by the lacquer and varnish industry, for which purpose they are as suitable as, for instance, linseed oil. This separation cannot be attained by direct distillation, but there is a possibility of attaining this end by means of appropriate chemical reactions.

If the fatty and resin acids can be separated quantitatively, by methods for which several patents have been granted, the largest problem remaining here in Finland is the use of the resins. Our domestic annual consumption of rosin is about 5,000 tons. Hence from 5,000 to 6,000 tons of rosin will remain in excess. Greatest attention should thus be paid to find new uses for rosin, as fats can always be disposed of.

New Methods for Treatment and Use of Wood Waste

By

HAROLD E. BOWERS

Mellon Institute, Pittsburgh, Pennsylvania

The problem of utilization of the vast quantities of wood waste that are produced annually by the timber industries is one of long standing. It is said that two-thirds or more of the timber harvest is wasted. In the past many efforts have been made to reconstruct this waste into board or board-like material. Hard boards have been produced in which the wood serves as a filler in a molded plastic. Other hard boards have been made by the well-known process which involves first the separation of the fiber from chips by explosion with high-pressure steam, and subsequently the pressing of the moist fiber at an elevated temperature; the lignin present in the wood serves as the binder. It may be remarked also that fibrous boards of various densities have been made from fibers other than wood fiber, such as bagasse, seed-flax straw and the fibrous residue from the extraction of licorice root; boards of this character are useful as heat-insulation, but they are not distinguished by structural strength.

Despite the excellence of the various hard boards for special applications, they do not retain the essential characteristics of lumber, and they cannot be satisfactorily substituted for wood in many of its traditional uses. Evidently, this unsuitability is ascribable, at least in considerable measure, to the fact that these dense boards do not have the porosity characteristic of wood. This means that, in addition to being heavier than wood, they cannot be nailed as readily as wood owing to their lack of porosity.

Some years ago, the management of the New England Box Company became interested in the idea of creating a reconstructed wood from white pine that could be used as a substitute for native wood. With this object among others in view, a research program was established at Mellon Institute for devising methods of utilizing white pine waste. Among the products and processes that have been evolved at the Institute in this work are a reconstructed wood, a low-density insulating material, a superfine wood flour, and a waterproofing process. Also, the separation of bark from sawdust has been studied. These various developments will be described in sequence in the following text.

Reconstructed Wood

In this project a series of tests was first carried out in order to select a suitable, cheap binder for sawdust and shredded-wood fiber. It was found that a very promising board could be made with the use of a starch binder. The molding composition consisted simply of the sawdust or fiber plus the starch (in granular form) and a quantity of water which, for convenience, did not exceed the combined weight of wood and starch. To form the molding, a weighted quantity of molding composition was compressed in a mold to a predetermined volume. Usually a small quantity of water was expressed, but this could be avoided, if desired, simply by using a smaller quantity of water in making up the batch. In general, however, it seemed desirable that the compressed molding batch should contain all the water it was possible for it to hold in its compressed state (to facilitate the subsequent formation of starch paste), and this condition was assured when a slight expression of water occurred. It should be noted that until this stage no heat was applied. But, after compression to constant volume, steam heat was applied for several minutes until the starch was gelatinized throughout the batch. Next, before relaxing the pres-

sure, the material was cooled in the press to about room temperature to prevent it from swelling and cracking when removed from the mold. After cooling, the product was firm and coherent, although heavy with moisture, and with careful handling it could be safely taken from the mold. The product was dried slowly at first and then more rapidly after it had begun to stiffen; if drying was too rapid, swelling and crack occurred.

Generally, the board produced from white pine waste by this process was molded to an apaprent density approximately equal to that of white oak. This practice was followed in order to attain the impact strength conforming to the requirement of the usage for which the board was intended. It could have been readily molded to a substantially lower or higher density, if desired. It was observed that the impact strength of the boards made from shredded-wood fiber was notably superior to that of similar boards made from sawdust. A board of fine texture and superior impact strength was produced from a rod-mill pulp, and also a superior board was made from Asplund fiber. Fibrous material derived from wet chips by a swing-hammer shredder appeared to be satisfactory, and probably less expensive than other material. Some firm and coherent boards of attractive appearance were made by substituting gelatinized wood for starch as binder; but their prospective high cost discouraged further effort in this direction. Some brief experiments with hardwood waste indicated that the molding process was also readily applicable thereto. Also, it is expected that the method might be used for making board from some of the fibrous agricultural residues.

Two features of the molding process are especially noteworthy, namely: gelatinization of the starch in situ and compression to constant volume. It was found that, if the starch was gelatinized after compression of the batch in the mold, a finer texture and greater impact strength were obtained than when the starch was gelatinized before compression. The molding of the batch to constant volume made it possible to impart the desired apparent density to the reconstructed board. If the batch had been molded at constant pressure, there would have been a progressive collapse of porosity which would have resulted in a board of higher density than that which was required. An outstanding characteristic of the wood-starch molding composition is its thermoplastic quality. A board may be recompressed to a higher density under conditions similar to those of the original compression even after a time lapse of weeks or months, and apparently it is required only that the moisture content must exceed an essential minimum and be fairly uniformly distributed throughout the board at the time of recompression. If the board is dried at room temperature, it will show a steep moisture gradient from inner to outer regions during the first few days of drying, and, if it is recompressed in this condition, it is likely to crack and be disrupted. The minimum moisture content which is necessary for recompression without crumbling was not determined, but apparently it lies somewhat below the equilibrium moisture content of the board under atmospheric conditions.

The task of creating a satisfactory reconstructed board proved to be much simpler than the problem of manufacturing such a board. Obviously, the conventional method of pressing in a hydraulic press was hopelessly uneconomic. The heating time was measured in minutes and likewise also was the cooling time. In addition, in each molding operation, a great mass of the metal of the press had to be carried through the temperature cycle. Accordingly it was decided to use a series of steel locking-molds. The weight of such a mold was in the neighborhood of 65 pounds. The batch was compressed in the mold, and the mold was then locked and put through the heating and cooling cycle. In order to carry out this process, a production line was devised in which the essential components were mounted along a horizontal, power-driven roll-conveyor. First came a hydraulic press, then an inductor coil for rapid heating, which was operated at a frequency of 60 cycles with a power input of 20 kilowatts, next a shower section in which water was sprayed on the molds for cooling, and finally a second hydraulic press for use in unlocking the molds. In this procedure the waste heat was limited mainly to that which was dissipated by the metal of the mold. The power consumed in the treatment of a flat, circular molded panel with a diameter of 15 inches and a thickness of slightly more than 5/8-inch, was found to be approximately 1 kilowatt-hour.

It was recognized, however, that in order to manufacture boards in various sizes, it would be necessary to have a large number of molds in sets of different sizes. For this reason, it was decided to consider other methods of manufacture which might be expected to yield a continuous board. At present two proposed methods for producing continuous board from the wood-starch mixture are under consideration. One of these methods requires the use of a continuous press. Although the formation of the board in a continuous press appears feasible, no such press is now available and the estimated cost of constructing a machine of this type is so great as to discourage effort in this direction. The second method involves the employment of extrusion by means of a rotating screw or auger. Some tests of this method have been made by extruding from a pug mill a mixture of sawdust, starch and water. The barrel of the mill was heated with steam and a comparatively long, water-cooled channel was bolted to the orifice of the extrusion nozzle. This channel was added so that the board could be cooled before it was allowed to emerge from compression. The two channels, which were thus joined, were matched in vertical and lateral dimensions so that no obstruction to the movement of the board occurred at the junction. A continuous board was formed by extruding a sawdust batch from the pug mill. As yet, atempts to extrude the fiber batch have not been successful, but it is believed that the difficulty can be overcome by redesigning the mill. When the fiber batch is molded by pressing, the fibers appear generally to be stratified in layers or planes at right angles to the direction of compression. It is anticipated, however, that molding by extrusion will produce a more random orientation as well as a tighter packing of the fibers. What effect this may have on the strength of the board remains to be seen.

Porous Materials and Cork-Like Structures From Wood Fiber

Porous structures of low apparent density have been made from wood fiber with the use of a finely-ground, sublimable solid, such as naphthalene, as an extender. Camphor and probably other water-insoluble, sublimable solids could be employed for this purpose. Mechanical wood fiber, such as groundwood pulp or rod-mill pulp, is used in the form of an aqueous slurry. To the pulp slurry is added, with vigorous mixing, a sludge prepared by beating naphthalene in the presence of water in a ball mill or rod mill. The quantities of wood fiber and naphthalene are proportioned in such a way as to yield a product of the apparent density desired. In order to do this, it is necessary to consider the density of dry wood substance, the density of naphthalene and the volume of product which is to be prepared. The well-mixed slurry of wood fiber and finely-ground naphthalene is filtered, and the resulting mat is pressed, without heating, until firmly compacted. Pressures ranging up to 1,000 p.s.i. and even up to 2,000 p.s.i. have been used for this purpose. The wet mat is allowed to dry, without heating, until equilibrium with the atmosphere is reached; if necessary, it may be given a second pressing in order to reduce it to the required dimensions. Obviously, it is necessary to dry the mat before proceeding to remove the naphthalene, since a reversal of this order would result in a partial collapse of pore structure as a consequence of shrinkage during drying. The dry mat is stored in a chamber maintained at a temperature just below the melting point of naphthalene. Air should be continuously circulated between the hot chamber and a cold chamber which is provided for the recovery of naphthalene; the air should not be vented.

The following sample calculation illustrates the method of computing the batch composition for producing a structure of a given apparent density, which, in this case, we have arbitrarily

chosen as 0.132 g./c.c.; this density value is similar to that of balsa wood.

Volume of mold cavity = 81.9 c.c. hence the required weight of wood = 81.9 x .132 = 10.8 g. This weight of wood is contained in 540 g. groundwood pulp slurry (2 percent pulp).

If the density of wood substance is taken as approximately 1.5 g./c.c., then the volume of wood substance required = 10.8/1.5 = 7.2 c.c. Consequently, the volume of space, in the mold cavity which remains to be filled is 81.9 — 7.2 = 74.7 c.c.

The density of naphthalene is 1.145 and hence the quantity of naphthalene required to fill 74.7 c.c. = 74.7 x 1.145 = 85.5 g.

Accordingly, a quantity of 540 g. groundwood pulp slurry (2 percent pulp) is mixed well with 85.5 g. finely-ground naphthalene (in the form of an aqueous sludge). The mixture is filtered with suction and pressed (without heating) in a mold having a cavity volume of 81.9 c.c.

The product is seasoned at room temperature until the wood fiber is dry, and the temperature is thereafter raised to a level only a few degrees below the melting point of naphthalene; the latter is then removed by sublimation.

By means of this method, it is possible to fabricate porous materials that have an apparent density comparable to that of cork or balsa wood or even lighter structures. The principal object of the process is to produce heat or sound insulators. For this purpose, it appears that satisfactory cohesion can be obtained without the use of a binder; the felting of the fiber appears to give the structure sufficient tenacity. A tighter bond can be effected, however, if there is incorporated in the batch a moderate proportion of rubber latex, polystyrene emulsion, vinyl-butyral dispersion or other aqueous dispersions of a comparable nature. In this way molded products have been made that show a striking, superficial resemblance to cork. A product, which was reinforced with polystyrene, appeared to approximate the stiffness of cork. It is said that cork contains 200 million cells per cubic inch. The cube root of this figure is approximately 585, and hence 200 million particles, each having a diameter of 1/585-inch, could be packed into a volume of 1 cubic inch. As a result of such packing, however, there would be no room for anything except the particles; and if these were naphthalene particles, they would have to be ground somewhat smaller than 1/585-inch in order to create a porous structure with as many cells per cubic inch as are present in cork. At present, it cannot be predicted whether such grinding would be feasible; agglomeration and crystal growth of the naphthalene might offer difficulties.

Some insulation bats were prepared that contained no binder. These bats had an apparent density of 7.6 pounds per cubic foot, which was similar to that of balsa wood. This material was found to have a K factor of 0.25, which compares favorably with that of present types of commercial heat-insulation. Low-density constructions of this type can be effectively waterproofed by means of a vapor treatment developed for use with molded wood products. It is evident that the economy of the process may depend largely upon the percentage of naphthalene that can be recovered. In small-scale, laboratory tests, a naphthalene recovery up to 94 percent has been realized. Other important cost factors would be those involved in the grinding of the naphthalene and the mixing and molding of the batch. Perhaps an extrusion machine could be used for molding.

A Superfine Wood Flour

A wood flour of unprecedented fineness has been prepared by grinding sawdust in a fluid-energy mill,* such as the "Micronizer" or the "Reductionizer." In order to accomplish a satisfactory grind, the sawdust must contain a substantial percentage of moisture. Efforts to produce a fine flour from dry sawdust have not been successful. Experiments have indicated that the fineness of the flour is influenced by variations in the moisture content of the sawdust and also by the rate of feed of sawdust to the mill. Hence it appears that the method may be used not only for producing a superfine flour, but also perhaps for making flour of the ordinary grades of fineness. Usually about 7 percent or more of coarse flour or wood particles can be removed from the fine flour by sifting. Refinements in processing might be expected to eliminate this coarse fraction.

It is true that the color of wood flour, produced by the fluid-energy mill, is materially darker than that made by grinding in the hammer and attrition mills. It is suspected that this color may be caused by the high temperature at which the mill is operated (superheated steam is used at temperatures in the neighborhood of 500° F. or higher) and by the iron-tannin reaction. Attempts to substitute compressed air for steam were not successful. In order to eliminate staining from the iron-tannin reaction, chromium-plating could be applied to the inner surfaces of the mill or a stainless-steel mill could be used.

The fluid-energy mill is much more compact than the sequence of hammer and attrition mills that is ordinarily used for the production of wood flour, and in addition, the fire hazard is greatly reduced. From the standpoint of equipment costs for a given productive capacity, it appears that the fluid-energy mill may prove to be more economical than the combination of hammer and attrition mills.

A Waterproofing Process

The water resistance of the described, starch-bonded boards was not good and it became necessary to contrive a waterproofing treatment. For mild exposure to moisture, a simple surface coating might suffice, although nails driven through the board could undermine the effectiveness of the protective coating. The waterproofing process that was finally developed was a formaldehyde-vapor treatment, which uses an acid catalyst. The treatment of lighter or more porous boards progressed more rapidly than that of denser boards, evidently owing to unequal diffusion rates of the vapors in the two types of board. The advantage of the gaseous treatment was the fact that it made unnecessary the treatment of reconstructed board with aqueous solutions; also, the treatment was not a mere surface effect, but it penetrated throughout the body of the wood. As would be expected, it was no longer possible to recompress the starch-bonded board as a thermoplastic after the formaldehyde treatment had been applied. There is some loss of impact strength as a result of the formaldehyde-vapor treatment, caused partly, it appears, by the action of the acid-formaldehyde and partly by the heating accompanying the treatment.

An Electrostatic Method for the Separation of Bark From Sawdust

A method that appears to be effective has been investigated for the separation of bark from sawdust. This method employs electrical attraction as a means of separation. The wood particles appear to be less firmly attracted than the bark particles to a charged surface. Some quite satisfactory separations were consummated at a potential difference of 10,000 volts DC.

It appears that two essential requirements for the successful operation of this method are close sizing of the sawdust and a moisture content in the neighborhood of about 7 percent or slightly lower. To meet the first requirement, the sawdust is sifted into closely-sized fractions, and each fraction is then processed separately. The second requirement could be met by drying or by storage in a room of controlled humidity. Experience seems to indicate that the fractions of smaller particle size can be separated at lower voltages than those which are used for separating the fractions of larger particle size. Fractions coarser than 8-mesh could not be separated even at 10,000 volts, which was the highest voltage attainable with the experimental equipment. It is possible, of course, that they could be separated at higher voltages. It was found to be difficult or impossible to separate fractions finer than about 25-mesh, owing apparently to the entanglement of the bark in the fine tendrils of the wood. Such finer fractions could be diverted to a cheaper grade of wood flour.

Acknowledgment

The cooperation and assistance of Dr. R. H. Lester, of the Watch Technology Fellowship, in designing and testing the bark separator is acknowledged with appreciation.

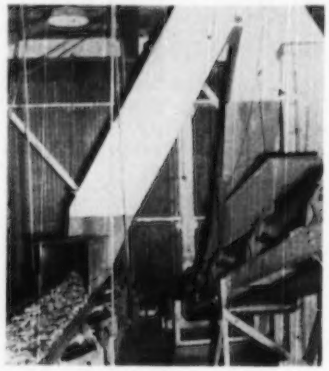
Pulpwood Handling
At Wood Conversion Company

Wood Conversion Company, producers of Balsam-Wool and Nu-Wood, are now operating a new chipping mill at their Cloquet, Minnesota, plant. Designed for efficiency and economy, the new mill is handling up to forty cords of pulpwood per hour with a crew of only six men. This crew is composed of a foreman, four laborers and a clean-up man.

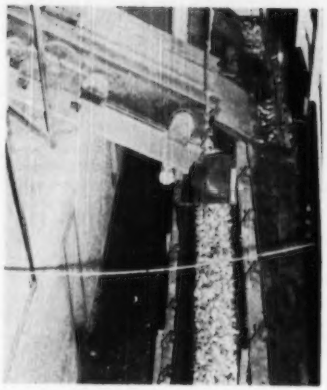
Pulp logs are unloaded from flat cars by a claw crane, which deposits them on a chain conveyor. Inside the mill the logs are transferred to a 48" flat belt conveyor feeding the chipper. Belt wear on this conveyor is minimized by use of pneumatic type carriers, which take up the shock load as logs are rolled onto the belt from the chain conveyor.

Chips are picked up by a 42" belt conveyor traveling at 450 FPM after passing thru cyclone separators, and elevated to a 30" horizontal flight conveyor, which feeds a battery of four screens. Chips passing thru the screens are carried by belt conveyor to storage silos. This system consists of two sloping runs of 24" belt traveling at 400 FPM. Chips failing to pass the screen are picked up by another belt and carried to a re-chipper and then returned to the main belt carrying them to storage by means of screw conveyors and bucket elevator.

Distribution of chips to the four tile storage silos is accomplished by a 36" belt which swivels about a center support. Running on a circular track, this belt is powered to rotate to any of the four silo openings. Limit switches stop the discharge end of the belt in proper position automatically. The storage silos are also equipped with automatic controls, which stop the flow of chips when the compartment is full.



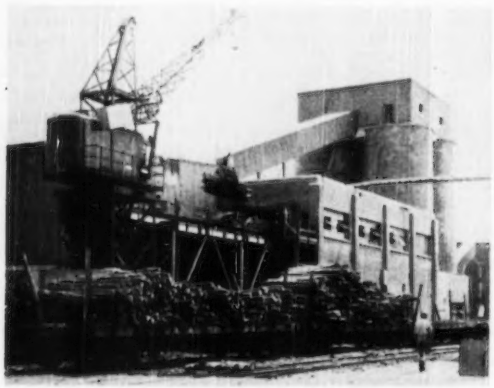
Chips pass from chipper and rechipper down chutes to conveyor belts.



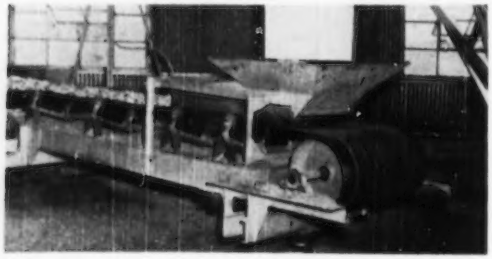
Chips pass from screen to main conveyor belt.

Feeders under the storage silos pick up the chips and transfer them to a 24" belt conveyor. This belt carries the chips 350 feet to the main building, where a shorter belt distributes the chips to the digesters.

Unloading logs from Chain conveyor to flat belt conveyor.



Unloading pulp logs from cars with clam shell grab.



"Merry-go-round" conveyor distributing chips to storage silos.

Chipper House & Silos—conveyor gallery to Digestors.

Patent Abstracts

● ***In addition to abstracts on the technology of pulp, paper and related industries, miscellaneous abstracts which may provide useful information are included.***

2,485,704—Folded Blank Cup. Harold B. Cranshaw, Newton, Mass., assignor to Burnitol Manufacturing Co., Charlestown, Mass. Filed October 5, 1944—Issued October 25, 1949.

A paper cup of the type having a bottom, outwardly flaring sides, and corner gussets folded outwardly along the outside of two opposite sides, a flange integral with the upper edge of a third side and folded inwardly, the flange having integral arms tapering toward their free ends extending laterally between the folds of the adjacent gussets, said opposite sides having integral extensions adapted to fold over and then under said gussets to hold the gussets in said folded position, and the upper edges of said arms projecting above the upper edges of the gussets when the gussets are in said folded position, whereby when said extensions are folded as aforesaid they press the arms downwardly to hold said flange firmly againts the inside of the cup.

2,485,744 — Treatment of Tall Oil and Portions Thereof. Samuel Koonce and Edmond S. Perry, Rochester, N. Y., assignors to Distillation Products, Inc., Rochester, N.Y. Filed September 20, 1946 — Issued October 25, 1949.

The process which comprises in combination esterifying the fatty acids of tall oil with a monohydroxy aliphatic alcohol without substantially esterifying the rosin acids of said oil, dissolving the mixture of esterified fatty acids and unesterified rosin acids in a solvent thereof, removing rosin acids by contacting said mixture with an adsorbent effective to adsorb substantially all of the unesterified rosin acids from said mixture without substantially adsorbing esterified fatty acids therefrom, and thereafter washing said adsorbent with a strong eluting solvent effective to remove adsorbing rosin acids therefrom.

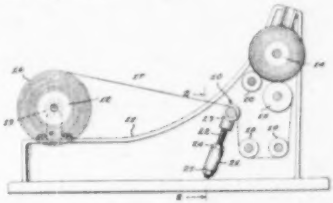
2,486,006—Apparatus for Unwinding and Winding Web Material. Everett W. Clem, Shrewsbury, Mass., assignor to Rice Barton Corporation, Worcester, Mass. Filed May 31, 1945—Issued October 25, 1949.

Apparatus for unwinding and winding web material comprising unwinding and winding machines having each a power driven drum, means for rotating the drums at the same peripheral rate and controlling the tension on a web moved therebetween supports for holding two web rolls simultaneously in a radially free peripheral rotating contact with the drum of each machine and which are arranged for transferring a roll from one to another of two circumferential positions in relation to each drum while it is maintained in a freely rotating peripheral contact with the associated rotating drum, and means for rotating a new supply roll of the unwinding machine at substantially full speed prior to its contact with the old web on its associated drum, so that a web may be unwound from a succession of supply rolls and rewound.

2,486,037 — Twisted Paper Thread and Method of and Apparatus for Twisting the Same. Ernest E. Lambert, Springfield, Mass., assignor to Patchogue-Plymouth Mills Corporation, New York, N.Y. Filed November 16, 1946—Issued October 25, 1949.

A machine for making thread by drawing ribbons while simultaneously twisting them together, comprising a guide bar having slotted openings formed therein through which said ribbons may be separately threaded, a die disposed beneath said guide bar through which said formed thread is adapted to be drawn, and said guide bar being mounted to reciprocate relative to said die to displace certain of said drawn ribbons laterally with respect to another ribbon.

2,486,121 — Web Spreading Device. William H. Corn, Pisgah Forest, N.C., assignor to Ecusta Paper Corporation. Filed January 24, 1947—Issued October 25, 1949.

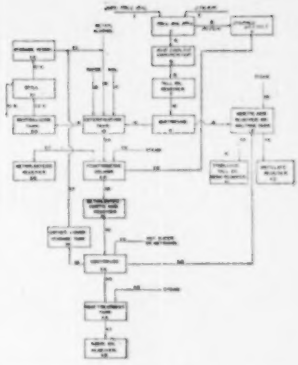


A spreading device for avoiding wrinkles in a traveling web comprising a spreader member over which the traveling web may be trained, an extending strut element positioned substantially midway of said spreader member, a tie structure fixed on said spreader member adjacent the ends thereof and tensioned over said strut element to bow said spreader member, and means operable at one end of said spreader member for adjusting the extending position of said strut element to vary the force exerted through said tie structure and thereby adjust the degree of bow in said spreader member.

2,486,803—Absorbent Fibrous Sheets and Method of Making Same. Raymond B. Seymour and George M. Schroder, Chattanooga, Tenn., assignors to Henry H. Frede and Company, Chattanooga, Tenn. Filed June 14, 1946—Issued November 1, 1949.

The process of making a moisture absorbent article suitable for toweling which comprises applying to a sheet of unwoven fibers having a random distribution, a substantially continuous coating of a 0.5 to 2.0% aqueous solution of a sodium salt of a carboxy alkyl derivative of cellulose, and applying heat within the range 300° to 450° F. to expel the water of solution and convert the cellulose derivative to an essentially water insoluble product.

2,487,000—Process of Separating the Constituents of Tall Oil and Similar Mixtures. George E. Taylor, St. Louis, Mo., and Joe S. Metcalf and Lewis L. Branscomb, Anniston, Ala., assignors to Monsanto Chemical Company. Filed December 3, 1945 — Issued November 1, 1949.



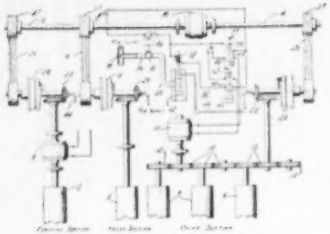
A process of producing valuable products from crude tall oil, which comprises refining said tall oil without substantial removal of unsaponifiable organic material; converting the fatty acids in said refined tall oil into alkyl esters by selective esterification with a monohydric aliphatic alcohol having from 1 to 5 carbon atoms; fractionally distilling the resulting ester mixture to produce a fraction consisting essentially of said alkyl esters, an intermediate fraction comprising abietic acid and a relatively small proportion of said alkyl esters; and a final fraction comprising a resinous pitch; cooling said intermediate fraction to crystallize abietic acid therefrom; separating said crystallized abietic acid and heating it to a temperature of from 250° C. to 350° C. for a period of about 8 hours to about ½ hour while subjecting the molten product during at least the final stages of said heat treatment to partial distillation and thereby producing a brittle glassy residue simulating commercial rosin and a distillate in an amount equivalent to about 11% to about 41% by weight of said molten product.

2,487,114 — Process for Producing Acetylatable Cellulose from Straw. Henry Dreyfus, deceased, late of London, England, by Claude Bonard, administrator, London, England, assignor to Celanese Corporation of America. Filed October 3,1945—Issued November 8, 1949.

Process for the production from straw of cellulose suitable for acetylation, which comprises giving the straw a pre-treatment with a dilute solution of sodium hydroxide at 100°-125° C. and subjecting the pre-treated straw at 30°-65° C. in two stages to the action of a solution resulting from mixing aqueous hydrogen peroxide and aqueous sodium hydroxide, the alkali concentration of the solution (reckoned as sodium hydroxide) being 0.25%-5% and the total amount of hydrogen peroxide and sodium hydroxide employed in the two stages being 5%-25% and 7%-20% respectively, both proportions being calculated on the dry weight of the straw before the pre-treatment.

2,487,702 — Motor Drive for Papermaking Machines. John E. Goodwillie and Edward D. Beachler, Beloit, Wis., assignors to Beloit Iron Works, Beloit, Wis. Filed March 2, 1946 — Issued November 8, 1949.

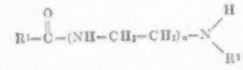
In a paper making machine or the like having a plurality of rotating sections and a driving motor for each section, the improvements of a tie-in shaft for correlating the rotational speeds of said sections, means for rotationally connecting said tie-in shaft with each of said rotating sections, said last mentioned means including solenoid controlled clutches connected respectively between said rotating sections and said tie-in shaft, and



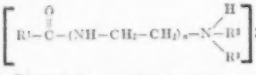
means for actuating each of said solenoid controlled clutches in response to energization of the respective drive motor, said last mentioned means including relays respectively having normally open contacts in circuit with said clutch solenoids and the windings thereof respectively in circuit with said driving motors.

2,487,899 — Process of Wax Sizing Papermaking Fibers Using a Cationic Surface Active Agent. Laurence R. Sherman, Glens Falls, N. Y., assignor to Nopco Chemical Company, Harrison, N. J. Filed May 10, 1945 — Indexed November 15, 1949.

A process for wax-sizing paper fibers, the steps consisting of suspending the fibers in water, heating the suspension to a temperature sufficiently high to melt wax, adding wax to the aqueous suspension, heating the suspension until the wax has completely melted and mixed with the fibers, and fixing the wax on the fibers by adding a cationic surface active substance to the fiber and wax suspension, said cationic substance being selected from the group consisting of amino-amides having the general formula:



and salts of said amino-amides having the general formula:

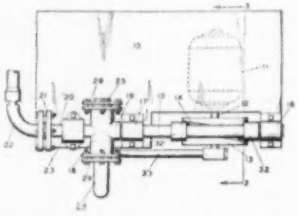


where R^1 represents an aliphatic chain containing from 7 to 23 carbon atoms, R^2 denotes a substituent selected from the group consisting of hydrogen and alkylol groups containing 1 to 3 carbons, and n is a number selected from the group consisting of 2 and 3 when R^2 stands for hydrogen and n is a number selected from the group of 1, 2 and 3 when R^2 represents an alkylol radical, R^3 denotes a substituent selected from the group consisting respectively of hydrogen, when R^3Z is a 1 to 3 carbon aliphatic monocarboxylic acid, and an aliphatic alkyl group of from 1 to 3 carbon atoms, when R^3Z is an ester of a mineral acid with a 1 to 3 carbon aliphatic alcohol, and Z is selected from the group consisting of the respective residues of said acid and said ester.

2,487,908—Apparatus for Determining the Strength of Paper and Other Foliaceous Material. Arnoldus J. J. M. van der Korput, Baarn, Netherlands. Filed October 2, 1946—Issued November 15, 1949.

In a device for testing paper and other foliaceous materials, two concentric clamping members, means for rotatably supporting the two clamping members on a common axis, the clamping members clamping the material to be tested in a plane perpendicularly to the common rotation axis of the two clamping members in such a manner that an annular portion of the material is exposed between the two concentric clamping members, the annular portion of the material transmitting the rotary force of one of the clamping members to the other clamping member, means for rotating one of the clamping members, and means for indicating the force exerted on the annular portion of the material to be tested when transmitting the rotary movement to the other clamping member.

2,488,041 — Hydraulic Debarking Method. Frank H. Swift, Oreg., assignor to Crown Zellerbach Corporation, San Francisco, Calif. Filed October 3, 1946 — Issued November 15, 1949.



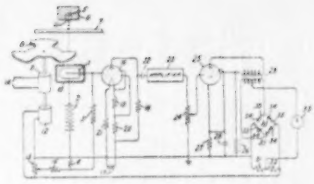
In the hydraulic debarking of a log, the method of removing bark in a wide strip with a hydraulic jet engaging the log in a path in said strip, said method comprising providing for a relative movement between the surface of said log and the debarking apparatus during the debarking of the strip, causing said jet to move back and forth in rapid strokes transverse with respect to said strip and thus causing said path of said jet to follow transverse courses across the strip, directing said strokes of said jet so that each transverse course of said path will be in a forward oblique direction with respect to said relative movement of the surface of said log but so that the position of said path at the termination of each stroke will be not more than the width of said path ahead of the position of said path at the beginning of that stroke, moving said jet in a direction opposite said relative movement of the log surface at the end of each stroke so that said path will be moved back a distance not exceeding the width of said path, and restricting the said relative movement of said log surface to an amount not exceeding the width of said path for each stroke.

2,488,186 — Process for Preparing Phenolic Material from Lignin Substance. Donald H. Grangaard, Appleton, Wis., assignor, by mesne assignments, to Sulphite Products Corporation, Appleton, Wis. Filed August 8, 1947—Issued November 15, 1949.

The process of preparing phenolic compounds containing a substantial proportion of catechol which comprises subjecting a lignin substance to a stable amine hydrohalide reaction mixture at a temperature of about 200°-300° C., maintaining said temperature for at least about two hours and recovering the phenolic compounds from the reaction mixture.

2,488,269—Noncontacting Thickness Gauge. Charles W. Clapp, Schenectady, N. Y., assignor to General Electric Company. Filed June 19, 1948 — Issued November 15, 1949.

A thickness gage comprising a detector of subatomic particles which provides a voltage dependent in magnitude on the rate of arrival of such particles at the detector, a source of subatomic particles positioned to direct a beam of such particles through the material measured toward said detector, means including a shutter positioned in



the beam between said source and said detector to modulate periodically the particle density of such beam, so that the voltage provided by said detector has an alternating component, said shutter being proportioned to produce substantially variations in its attenuation of such beam of subatomic particles and to be substantially transparent to radiations of greater penetrating power, whereby high energy background radiations do not substantially influence such alternating component of voltage, and means to measure such alternating component of voltage.

2,488,385—Sizing Compositions. Arthur C. Dreshfield, Chicago, Ill., assignor to Hercules Powder Company, Wilmington, Del. Filed March 23, 1945—Issued November 15, 1949.

A nondusty dry saponified rosin size composition readily dispersible in water and resistant to oxidation in the air, comprising saponified rosin stabilized with a secondary organic amine in an amount sufficient to provide substantial resistance to oxidation in the air, and a wax incorporated with the saponified rosin in an amount between about 5 per cent and about 35 per cent by weight of the entire composition, said wax serving to increase the resistance of the composition to oxidation in the air and to render it substantially nondusty, said secondary organic amine having the general formula

wherein R signifies an appropriate radical selected from the class consisting of phenyl, naphthyl, lower alkyl-phenyl, lower alkoxy-phenyl, lower alkyl-alkoxy-phenyl, and lower alkyl-naphthyl radicals, and R' signifies an appropriate radical selected from the class consisting of phenyl, naphthyl, lower alkyl-phenyl, lower alkoxy-phenyl, lower alkyl-alkoxy-phenyl, lower alkyl-naththyl, tetrahydronephthyl, cyclohexyl, hydrocarbon-substituted cyclohexyl, lower alkyl, lower hydroxy-alkyl and N-aryl aminophenyl radicals.

2,488,700—Apparatus for Paper Manufacture. George L. Bidwell, Reigelsville, Pa., assignor to Riegel Paper Corporation, New York, N. Y. Filed May 17, 1945 — Issued November 22, 1949.

A paper machine having a short endless wire screen passing over breast and couch rolls and having a portion of the travel of the screen in an upwardly inclined direction, a flow box for supplying diluted fiber to said screen during a portion of said upward travel and for forming a pond of such diluted fiber of progressively decreasing depth in the direction of travel of the screen, a suction box arranged below the screen and below the pond of diluted fiber above the screen, said suction box being divided into two transverse sections arranged in tandem in the direction of travel of the screen, one section having a series of guiding vanes arranged at an angle for causing transverse flow in one direction and the other section having a series of guiding vanes arranged at an angle in a cross-wise direction for causing transverse flow in a cross-wise direction as the screen passes upwardly thereover below the pond of diluted fiber, and means for removing the resulting sheet of paper from the screen as it passes over the couch roll.

SYMBOL of
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B. F. PERKINS & SON, Inc.
ENGINEERS AND MANUFACTURERS
HOLYOKE, MASS.

LARGEST MANUFACTURERS OF CALENDER ROLLS IN THE WORLD

Dividends Declared

Bathurst Power & Paper Co., Ltd. has declared a dividend of 50c per share on Class "A" plus 50c special dividend, payable March 1 to stockholders of record February 1 and another dividend of 50c on Class "B", payable March 1 to stockholders of record February 1.

Oswego Falls Corp. has declared an extra dividend of 25 cents, payable December 28 to stockholders of record December 21. This will make a total of $1.25 a share paid in 1949.

Dryden Paper Co., Ltd., has declared a dividend of 30 cents per share, payable February 1 to stockholders of record December 31.

Strathmore Paper Co. Reports

SPRINGFIELD, Mass—Strathmore Paper Co. held its annual meeting in West Springfield, Monday, December 19, with the largest attendance on record.

In his report to the stockholders, George E. Williamson, president of Strathmore, stated that the fiscal year ending October 31, 1949 had been a good one, in fact somewhat better than the previous year, in spite of a business recession which caused many industries to show reduced sales and income.

Although there are many intangibles in the offing — possible international complications, adverse political action, strikes, exorbitant and possibly unbalanced State and Federal budgets, increased taxes, socialistic trends and many others—which may cause a lack of confidence and a slump in business, Mr. Williamson believes the favorable factors over-balance the unfavorable ones, and that a continuation of good business is assured for 1950, at least for the first half of the year.

Although retirement plans are very few in number among fine paper mills, the Strathmore Plan inaugurated in 1947, is progressing favorably and increasing in coverage.

The following were re-elected as Directors of the company: G. E. Williamson, C. M. Bryan, A. E. Shattuck, F. N. Bridgham, C. A. Russell, H. J. Rice, B. E. Stafford, R. F. Arnold, L. W. Shattuck, H. E. Riggs, W. A. McGilpin, and Nelson Feeley.

Building

- **FOR THE PAPER INDUSTRY**
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- Under one contract and one responsibility, we deliver jobs complete, ready for operation.
- We also furnish engineering reports and surveys. Current cost data available at all offices.

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OFFICES IN NEW YORK, HOUSTON, CHICAGO, CINCINNATI AND LOS ANGELES

FINANCIAL RECORD

PREFERRED STOCKS	Per Share Earnings: Calendar Year 1948	Per Share Earnings: 12 Mo. to Approx. 9/30/49	Indic. Annual Divid. Rate	Dec. 20 Approx. Market Price
Armstrong Cork Co. $3.75 Cum.	$46.33*	$38.47*a	$3.75	$101¼
Armstrong Cork Co. $4.00 Cum. Conv.	46.33*	38.47*a	4.00	112½
Celotex Corp. 5% Cum.	26.42c	10.33p	1.00	17⅜
Champion Paper & Fibre $4.50 Cum.	99.97f	37.50j	4.50	98⅛
Container Corp. of Amer. 4% Cum.	105.41	90.43	4.00	101¾
Crown Zellerbach $4.00 Cum.	63.92b	57.02q	4.20	100⅝
Dixie Cup Co. $2.50 Cum. Conv. Cl. A	10.10	10.44	2.50	51¾
Flintkote Co. $4 Cum.	83.25	61.44	4.00	104¾
Robert Gair Co., Inc. 6% Cum.	17.08	12.88	1.20	18½
International Paper Co. $4 Cum.	263.00	245.41	4.00	103¾
Johns-Manville $3.50 Cum.	209.89	204.89	3.50	131½
Kimberly Clark Corp. 4½% Cum.	80.74	70.92	4.50	107½
Kimberly Clark Corp. 4% Cum. Conv. 2nd	41.59*	42.20*	4.00	103
MacAndrews & Forbes 6% Cum.	62.23	64.10	6.00	138½
Mead Corp. 4¼% Cum.	73.46	49.00k	4.25	81¾
Mead Corp. 4% Cum. Conv. 2nd	29.91*	19.93k*	2.00	32¾
Paraffine Cos. Inc. 4% Cum. Conv.	156.11	74.77	4.00	102½
Rayonier Inc. $2 Cum.	16.43	10.76	2.00	30½
St. Regis Paper Co. 4.40% 1st A	79.90	34.21	4.40	86½
Scott Paper Co. $3.40 Cum.	59.06	52.36	3.40	106½
U. S. Gypsum Co. 7% Cum.	314.45	281.64	7.00	183⅞
United Wallpaper Inc. 4% Cum. Conv.	(d)0.79	15.43	2.00	26½
West Virginia Pulp & Paper 4½% Cum.	79.45c	69.93p	4.50	108¾
COMMON STOCKS				
APW Products Co.	$0.73	(d)$1.01	(m)	3⅛
American Writing Paper Corp.	(d)0.15	0.05	$0.25	6½
Armstrong Cork Co.	7.54	6.13a	3.00	50½
Celotex Corp.	7.21c	1.87q	1.00	18¾
Certain-Teed Prods. Corp.	4.02	3.89	1.00	15⅞
Champion Paper & Fibre	8.70f	3.20j	2.00	31¾
Congoleum Nairn Co.	5.78	4.92a	2.00	27⅜
Container Corp. of America	10.12	8.50	4.00	38¾
Crown Zellerbach	7.16b	6.33q	2.00	28½
Dixie Cup Co.	6.70	7.00	1.50	37
Eastern Corp.	4.76	d0.07	(h)	15⅝
Flintkote Co.	5.86	4.14	2.50	30½
Robert Gair Co., Inc.	2.67	1.96	0.70	7⅝
Great Northern Paper Co.	4.63	5.21	2.80	40⅞
International Paper Co.	16.73	15.59	5.00	35⅞
Johns-Manville Corp.	5.22	5.07	2.50	48½
Kimberly Clark Corp.	5.02	4.32	1.65	24⅞
MacAndrews & Forbes Co.	3.68	3.79	2.50	38½
Marathon Corp.	4.11c	3.29q	1.40	25½
Mead Corp.	6.36	3.98k	1.00	15⅜
National Container Corp.	2.28	1.04	0.40	8
Paraffine Cos. Inc.	2.45	1.15	1.20	20¼
Rayonier, Inc.	9.09	5.52	2.00	26⅜
Ruberoid Co.	10.62	8.43	3.25	57¼
St. Regis Paper Co.	2.71	1.02	0.60	8
Scott Paper Co.	4.15	5.38	3.00	69⅝
Sutherland Paper Co.	6.02	5.12	2.50	40¼
Union Bag & Paper Corp.	9.17	5.36	3.00	28¾
United Board & Carton	2.04b	(d)1.61g	(e)	8½
U. S. Gypsum Co.	15.04	13.43	9.00	112¾
United Wallpaper	(d)0.10	0.42	(n)	3⅛
West Virginia Pulp & Paper	11.33c	9.70p	3.00	50½

(a) 12 months to approximately 6/30/49
(b) Year ended 11/23/48
(c) Year ended 10/31/48
(d) Deficit
(e) Omitted dividend 2/4/49
(f) 11 months to 3/31/49
(g) 12 months to approximately 11/13/49
(h) Directors took no action on August, 1949 dividend—last payment 5/2/49
(i) 12 months to approximately 1/30/49
(j) 6 months to 9/30/49
(k) 12 months to approximately 10/2/49
(m) Directors took no action on July, 1949, dividend—last payment 1/10/49
(n) Last payment 25c, 9/16/47
(p) 12 months to approximately 7/31/49
(q) 12 months to approximately 10/30/49
(*) Earnings per combined preferred shares.

PRICES

The prices below reflect general market quotations at the mill level on the standard grades in which the normal volume of business is being done. Does not include occasional spot offerings.

NEW YORK

Delivered Ports

Standard News, per ton—

Rolls, contract	$100.00/	—
Sheets	115.00/	—

F.o.b. Mills, Carload freight allowed, dock N. Y.

Kraft— per cwt., 40# base wgt.

Standard Wrapping Rolls	$6.50/	—
No. 1 Wrapping Rolls	7.25/	—
Standard Bag	6.00/	—

Tissues— per ream 24x36 (480) 10 lbs. 2500 lbs. or more

Wh. No. 1 Frd.	$1.55 /	—
Wh. No. 1 M. G.	1.50 /	—
Wh. No. 1½	1.35 /	1.40
Wh. No. 2	1.10 /	1.20
Kraft Anti-Tar	1.37½/	—
White Anti-Tar	1.75 /	—
Shrd. Wh. No. 1 per lb.	.11½/	—

Toilet— per case of 100 rolls—1 M sheets.

Unbleached 4½x4½	$5.75/	—
Bleached 4½x4½	6.95/	—
Bleached 4½x8½	8.80/	—

Per Case of 50 rolls—2000 sheets

Unbleached 4½x4½	$5.75/	—
Bleached 4½x4½	6.80/	—

Per Case of 100 rolls—1000 sheets

Facial, 4½ x 5, 2 ply	$8.95/	$9.45

Paper Towels— per case of 3750.

Wh. Jr. M'tif'd 9¼x9½	$5.25	
Br. Sr. M'tif'd 10x12	3.60	
Br. Jr. M'tif'd 9½x9¾	3.10	
Br. Jr. Sgl. fold 10x10¾	3.15	
Bkhd. 7½ x 11, 24/25 rolls	$3.95/	$6.25

Manila, per cwt.

No. 1 Jute Tag 40 lb., sheets*	$15.05/	$17.50
Reg. Jute M.F. Manila, sheets*	13.50/	15.50
Wrapping Manila	8.75/	10.50
Printing Manila	10.00/	11.00

* Less usual allowance for rolls.

Boards, per ton—

Filled News	$72.50/	$75.00
Plain Chip	70.00/	—
Bkhd. Mla. L-d. Chip*	97.50/	—
White Pat. coated*	115.00/	—
Kraft Liners 42 lb.	100.00/	
Kraft Corr. .009	105.00/	
Binders Boards	110.00/	116.00

* Base Prices per 10 tons. Less than 10 tons but over 3 tons, add $2.50; three tons or less, add $5; regular 35-39 basis, add $5; basis 40-49, add $2.50; basis 91-100, add $2.50; basis 101-120, add $5.

WORLD WOOD PULP MARKETS

First Quarter Contract Prices, Per Short Air-Dry Ton

	Delivered, with varying freight allowance		Full freight allowance* On dock Atlantic Ports		
	U. S.	Canadian	Swedish	Finnish	Norwegian
Groundwood	$65.00/ —	$65.00/67.50			
Soda, Bleached	113.00/ —	113.00/ —		Competitive	
Sulphate, Bleached	118.00/126.00	126.00/ —	125.00/128.00		
Sulphate, Unbl'd North'n		82.50/105.00	82.50/ 85.00	with	
Sulphate, Unbl'd South'n	80.00/ 82.50				
Sulphite Blchd. (S'ftw'd)	118.00/ —	118.00/ —	118.00/ —	Domestic	Competitive
Sulphite, Blchd. (H'dw'd)	113.00/ —				
Sulphite, Unbleached	100.00/ —	100.00/ —	100.00/ —	Grades	
Sulphite, Unbl'd (Glassine)	105.00/ —	105.00/ —	104.00/105.00		

* Ex dock quotations average $5.00 lower.

WASTE PAPER MARKET

Prices to Mills*, (Per Ton) F.o.b. Cars Shipping Point

	New York	Philadelphia	Boston	Chicago
	Jan. 4	Dec. 5	Dec. 1	Dec. 5
No. 1 Mixed Paper	$11.00/$12.00	$ —/$10.00	$9.00/ —	$10.00/ —
Boxboard Cuts	11.00/ 12.00	7.00/ 8.00	— / 5.00	13.00/ —
Mill Wrappers	11.00/ 12.00	10.00/ 11.00	— / 9.00	12.00/ —
No. 1 News	14.00/ 15.00	10.00/ 12.00	11.00/ 12.50	18.00/ —
Over-issue News	16.00/ 17.00	12.00/ 15.00	8.00/ 10.50	21.00/ —
Corrugated Containers	19.00/ 20.00	16.00/ 18.00	14.50/ 15.50	20.00/ —
New Corrugated Cuts	20.00/ 22.00	20.00/ —	16.00/ —	23.00/ —
Double Kraft Ld. Corr. Cuts	34.00/ 35.00	30.00/ 35.00	25.00/ —	40.00/ —
Used Kraft Bags	28.00/ 30.00	25.00/ —	25.00/ 30.00	20.00/ —
No. 1 Brown Kraft Paper	30.00/ 35.00	25.00/ 30.00	30.00/ 35.00	20.00/ —
Super Resorted Br. Kraft	35.00/ 38.00	30.00/ 35.00	40.00/ —	35.00/ —
New Br. Kraft Env. Cuts	65.00/ 70.00	60.00/ 65.00	60.00/ 65.00	55.00/ —
New Br. Kraft Cuts	40.00/ 45.00	50.00/ —	45.00/ —	50.00/ —
No. 1 Gdwd. Shvs.	25.00/ 30.00	18.00/ 22.00	25.00/ —	28.00/ —
White Newsblanks	55.00/ 60.00	50.00/ 55.00	50.00/ 55.00	37.00/ 40.00
No. 1 Flyleaf Shvs.	30.00/ 35.00	— / 30.00	35.00/ 45.00	35.00/ —
No. 1 Soft Wht. Shvs.	80.00/ 85.00	65.00/ 70.00	70.00/ 80.00	55.00/ —
Super Soft Wht. Shvs.	85.00/ 90.00	70.00/ 75.00	80.00/ 90.00	60.00/ —
Hd. Wht. Shvs.	90.00/ 95.00	80.00/ 85.00	80.00/ 90.00	80.00/ —
Hd. Wht. Env. Cuts.	105.00/115.00	90.00/ 95.00	90.00/105.00	90.00/ —
New Manila Env. Cuts.	65.00/ 70.00	60.00/ 65.00	60.00/ 70.00	55.00/ —
Col. Tab Cards	35.00/ 40.00	20.00/ 25.00	35.00/ —	40.00/ —
Manila Tab Cards	70.00/ 75.00	65.00/ 70.00	75.00/ 80.00	65.00/ —
No. 1 Mixed Ledger	35.00/ 37.50	30.00/ 35.00	37.50/ —	40.00/ —
White Ledger	45.00/ 50.00	45.00/ 50.00	50.00/ 60.00	50.00/ —
Mixed Books & Mags.	12.00/ 13.00	10.00/ 12.00	12.00/ —	12.00/ —
No. 1 Rep'd Hvy. Books & Mags.	20.00/ 25.00	20.00/ —	22.00/ 23.00	23.00/ —

* Includes brokers' fee.

The following prices are representative distributors' resale prices:

Rag Content Bonds and Ledgers—
White, 20 lb.

Bonds

	4 Ctns.
	per cwt.
100% Rag Ex. No. 1	$51.40/$53.90
100% Rag	44.55/ 46.15
75% Rag	33.90/ 35.40
50% Rag	28.10/ 29.55
25% Rag	24.85/ 26.80

Ledgers

	4 Ctns.
	per cwt.
100% Rag Ex. No. 1	$52.65/$54.55
100% Rag	45.65/ 48.40
75% Rag	35.15/ 36.10
50% Rag	29.40/ 30.05
25% Rag	26.15/ 26.80

Sulphite Bonds and Ledgers
White, 20 lb.

Bonds

	4 Ctns.
	per cwt.
Watermarked	$16.55/$17.50
Plain	15.60/ 15.95

Ledgers

	4 Ctns.
	per cwt.
Watermarked	$18.05/$18.80

White Book
Conversion Coated

	Case
	per cwt.
No. 1	$19.75/$20.90
No. 2	19.25/ 19.65
No. 3	17.75/ 18.90
Machine Coated	
No. 1	16.40/ 16.65
No. 2	14.40/ 15.15
Uncoated	
No. 1 Antique (Watermarked)	16.40/ 17.90
Offset	15.15/ 16.65
A Grade E. F.	15.40/ —
A Grade S. C.	15.90/ 16.15
B Grade E. F.	14.90/ 15.15
B Grade S. C.	15.40/ 15.65

Rag Market

New Domestic Cotton Cuttings
(Prices to Dealers, F.o.b. Ship. Pt.)

	Per 100 lbs.
White Shirt	$10.00/ $10.75
Unbleached Muslin	9.75/ 10.50
Light Silesias	6.50/ 7.50
White Back Blue Overalls	5.50/ 6.25
Blue Overalls	4.50/ 5.00
Fancy Shirt	4.50/ 5.00
Percales	5.50/ 6.00
Light Prints	5.50/ 6.00
No. 1 Washables	2.75/ 3.00
Bleachable Khaki	4.50/ 5.00
Unbleachable Khaki	3.75/ 4.50
Cottonades	4.00/ 4.75
Lt. Flannelettes	6.75/ 7.25
Men's Corduroy	3.50/ 4.25
Women's Corduroy	3.00/ 3.75
Canton Flannels, Blchd.	8.50/ 9.00
Underwear Cutters, Blchd.	10.75/ 11.25
Underwear Cutters, Unblchd.	10.50/ 11.00

Old Domestic Cotton Rags
(Prices to Dealers, F.o.b. Ship. Pt.)

	Per 100 lbs.
No. 1 Whites, Repacked	$4.25/ $4.75
No. 1 Whites, Miscellaneous	3.50/ 4.00
No. 2 Whites, Repacked	2.75/ 3.00
No. 2 Whites, Miscellaneous	2.00/ 2.25
Cotton Pants & Overalls	2.25/ 2.75
Thirds and Blues, Repacked	2.00/ 2.75
No. 1 Roofing Rags	1.50/ 1.60
No. 2 Roofing Rags	1.40/ 1.50
No. 3 Roofing Rags	1.25/ 1.30
No. 4 Brussels & Ind. Bck'd crpts.	1.25/ 1.30
Scouring Bagging	.80/ .95

New Foreign Cotton Cuttings
(Prices to Mills, F.o.b. Dock, N. Y.)

	Per 100 lbs.
New Dark Cuttings	$2.75/ $3.00
New Mixed Cuttings	2.75/ 3.00
Light Silesias	6.50/ 7.00
Light Flannelettes	5.50/ 6.00
New White Cuttings	10.00/ 10.50
New Unbleached Cuttings	10.00/ 10.50

Fancy Shirt Cuttings	4.50/	4.75
Light Prints	4.25/	4.50
Bleachable Khaki, No. 1	4.25/	4.50
Unbl. Khaki, No. 1	4.00/	4.25

Old Foreign Rags
(Prices to Mills, F.o.b. Dock, N. Y.)

	Per 100 lbs.	
No. 1 White Cottons	$6.50/	$7.00
No. 2 White Cottons	5.50/	6.00
No. 3 White Cottons	4.00/	4.50
No. 4 White Cottons	3.00/	3.50
Extra Light Prints	4.50/	5.00
Old Light Prints	4.00/	4.25
Med. Light Prints	2.50/	2.75
Dutch Blue Cottons	3.25/	3.50
Checks and Blues	2.75/	3.00
Linsey Garments	2.10/	2.40
Dark Cottons, European	2.00/	2.10
Dark Cottons, Egyptian	1.85/	2.00
Old Shopperies	1.75/	1.85
New Shopperies	2.00/	2.25

Bagging
(Prices to Dealers, f.o.b. N. Y.)

	Per 100 lbs.	
Foreign Gunny	$5.50/	$7.00
Domestic Gunny, No. 1	5.50/	7.00
Heavy Wool Tares	6.00/	6.50
Foreign Manila Rope	4.50/	4.75
Domestic Manila Rope	4.25/	4.50
Jute Strings	5.50/	5.75
No. 1 Sisal Strings	4.50/	4.75
Mixed Strings	1.15/	1.30
Heavy Baling Bagging	7.50/	8.00
Paper Mill Bagging	4.00/	4.25
No. 1 Scrap burlap		
Foreign	4.25/	4.75
Domestic	4.50/	5.00
Austr. Wool Pouches	6.50/	7.00
New Burlap Cuttings	6.00/	7.00

MATERIALS

Blanc Fixe

Prices on by-product rise $2.50, Jan. 1. Heavy demand. Supply adequate. Currently quoted at $90.00 in bags, car lots, at works, 6 cents per pound, l.c.l., deld. By-product supply somewhat restricted. Quoted at $80.00 per ton, car lots, at works, 6 cents per pound, l.c.l., deld.

Bleaching Powder

Demand improved. Prices steady. Prices range from $4.50 to $5.00 per 100 pound drums, l.c.l., works.

Casein

Argentine market strengthened by European orders. Current prices on processed acid precipitated domestic grades 22½ to 24 cents, imported grades 18¾/19 cents, ex dock, N. Y. car lots.

Caustic Soda

Demand strong. Stocks adequate for prompt shipment. Prices unchanged. Solid caustic is reported at $3.05 per cwt.; flaked and ground is quoted at $3.45 per cwt., in 400 pound drums, $3.95 per cwt. in 100 pound drums—car lots, at works; liquid 50 percent in tank cars at $2.40 per cwt.; liquid 73 percent in tank cars at $2.50 per cwt., at works.

China Clay

Demand strong. Supply of domestic and imported ample. Domestic airfloated filler quoted at $10 per ton, water-washed $11.00, car lots, f.o.b. mines. Coating clay is $16 to $30. Imported clays repriced to $15.20 and $28.35 short tons, expert warehouse.

Chlorine

Supply continues tight. No early easing seen. Demand strong. Prices firm. Currently quoted at $2.40 per cwt. in single unit tank cars; at $2.70 to $3.90 per cwt. in multitank cars, f.o.b., works.

Rosin

Trading dull. Production at seasonal ebb. Large quantities rushed into loan. Prices drop 10 cents. Gum rosin in drums, per 100 pounds net in car lots, f.o.b. Savannah, B, $8.75; G, H, I, K, $6.30; wood rosin, per 100 lbs., car lots, f.o.b. Savannah; B, $4.25; FF, $5.50.

Rosin Size

Demand steady. Supply good. Seventy percent gum and pale grades, tank cars, $5.47 to $5.63 f.o.b. southern shipping point.

Salt Cake

Demand from kraft mills heavier. Supply adequate. Domestic quoted at $22.00/$24.00, f.o.b. shipping point, freight allowed to destination.

Soda Ash

Demand—supply in balance. Current prices, car lots per 100 pounds; light ash in bulk, $1.00; in paper bags, $1.25.

Starch, Corn

Demand good. Supply adequate. Prices guaranteed against rises to Jan. 15. Pearl grade currently quoted at $4.87 per 100 pounds; powdered starch at $4.98 per 100 pounds; white corn dextrine at $6.14 per 100 pounds; car lots, f.o.b. Chicago.

Starch, Potato

Heavy paper demand. Supply shows notable easing in both Maine and Idaho. Idaho high grade quoted at $7.25 cwt., l.c.l., ex N. Y. whse. New production quoted at $5.25 cwt., car lots, f.o.b. shipping point. Maine production quoted at $5.00 cwt., f.o.b. shipping point.

Sulphate of Alumina

Demand steady. Prices firm. Supply good. The commercial grades are quoted from $1.50 per 100 pounds, in bags, car lots, f.o.b. works. Iron free is $2.75 per 100 pounds in bags, car lots, at works.

Sulfur

Supply ample. Demand sustained at good level. Prices firm. Annual contracts are quoted at $18 per long ton, f.o.b. mines; $19.50, f.o.b. vessels, Gulf ports. Export price f.o.b. Gulf ports is $22.00 per long ton.

Talc

Demand continues far ahead of supply. Prices steady. Domestic grades are currently quoted at $23 to $28 per ton in 50-lb. paper sacks, car lots, f.o.b. mills; Canadian at $35 and up per ton.

Tapioca Flour

Supply liberal. Fair demand. Prices ease. Dextrinizable grades range from $9.00/$9.75 cwt.; for superior high grades to $7.75/$8.25 cwt.; for highs, on dock Atlantic and Gulf ports. Medium grades range from $6.50 cwt. on dock, N. Y. Limited tonnages of Siamese low grade find ready kraft and corrugated market. Priced at $4.00 to $5.50 cwt. on dock, N. Y.

Titanium Dioxide

Stocks ample. Demand strong. Prices firm. Anastase 19½c pound carload lots, 20c l.c.l., rutile, 21½c pound carload lots, 22½c l.c.l.; 50-pound bags, f.o.b. plant, actual freight allowed.

? ? IMPORTS ? ?

Paper Trade Journal has omitted publication of the Imports; Classification and Quantities for three weeks. To date only two requests for reinclusion have been received. Please advise us of your interest in 1. Pulp; 2. Paper; 3. Other Classifications.

CONVERTERS

Robert Gair Buys Montreal Plant

NEW YORK—Robert Gair Co., Inc., reports that its Canadian subsidiary, Gair Co. Canada, Ltd. has purchased the capital stock and also the buildings and real estate previously under lease of Premier Paper Box, Ltd., Montreal.

Union Bag Introduces PEK Bag

NEW YORK—A new bag for prepackaging baked goods has just been announced by Union Bag & Paper Corp. Sold under the trade name, PEK (pronounced "peek"), this white kraft bag features a window of transparent film.

Leonard J. Doyle, vice-president, said that this bag has decided advantages for both the baker and his customers. "The bakers' greatest problem in packaging is to see that their products reach consumers in practically the same condition as they left their ovens. The PEK Bag affords baked goods sanitary protection against dust and handling, and the transparent window makes it a miniature showcase enabling customers to see what they buy. Prepackaging baked goods in PEK Bags saves the customer the usual packaging delays. It also increases the efficiency of the store operation, for sales-girls can prepackage during slack periods and thus handle more customers during the rush hours."

PEK Bags can be printed up to three colors. They are available in a range of standard sizes through local Union distributors.

Gair-Reynolds Foiline Cartons

BOSTON, Mass. — Reynolds Metals Co., in association with Robert Gair Co., will produce an expanded line of packaging to be called "Gair-Reynolds Foiline" folding cartons. This association will result in a completely integrated aluminum foil carton manufacturing operation. Sales territories will extend westward to the Pacific Coast. Richard T. Clark, formerly associated with Reynolds, has been named assistant sales manager in charge of Gair-Reynolds Foiline cartons.

Toilet Tissue Excluded from Quota

OTTAWA—The Colombian Exchange Control Office will grant import licenses to any importer or merchant, without regard to the basic quota system, for certain specified products in accordance with a resolution that was recently adopted and these products include toilet paper, certain chemicals, etc., according to a report from Bogota.

Hearings on Classification Changes

By EDWIN CHESTER HASTINGS

The American Trucking Ass'ns., Inc., through the National Classification Board, will hold open hearings concerning proposed changes in the motor classification. The sessions begin at 10 a.m., January 11, 1950, Hotel Governor Clinton, New York City; January 17, Hotel Sherman, Chicago; January 31, 1424 16th street, N.W., Washington, D.C.; February 2, 873 Spring street, N.W., Atlanta.

Hearings are held by appointment and application should be made at once for allotment of time to NCB's secretary, N. F. Behme, Jr., at the above Washington address. The purpose of the appointment is to support or protest the proposals advocated by carriers, shippers and the Board. If exhibits are furnished or written arguments, the latter should be presented in three complete copies. Some of the proposals are of interest to the paper industry in an indirect manner. For example, a shipper of chemicals, proposes a change in the Classification description of "nickel chloride." The item now moves in "barrels or boxes." There are test shipments now being made in accordance with other type of packing under the conditions of Rule 33, and the results will be made known at the public hearings. In line with the tests, the shipper wants added to this item "or in burlap bags *lined with waterproof paper.*" It would be to the advantage of the maker of that paper to know exactly how the product endured the test for business reasons. The information can be secured in any of the cities where these hearings are held.

One of the big users of paper products is the furniture industry. Packing and shipping experts constantly test various types of packing and containers. The industry mainly for the reason to avert damages to their products are exceptionally cooperative with the rail and motor carriers. The chief interest of both groups is to have a covering protection that is strong and light in weight; packing and padding able to support the products from shock. To do this job, the field is filled with all types of material. Regardless of what type is used, weight is added to the product upon which the shipper must pay freight charges. For this reason, the paper industry has been able to gain so much ground, that is a sturdy product proven many times, is light in weight and low in cost.

But furniture men never rest and in the hearings they will present proposals related to classification changes in the paper products they use.

Unknowingly sometimes a manufacturer places a higher rate on his product than needed by giving information to the carrier that properly belongs in "sales literature." For example, a maker of plastic products furnishes to nurseries "protectors" for plants and trees.

It is a well known fact that paper protectors have been used for years. The product isn't fragile, and generally shipped nested in boxes. There is little danger of damage by crushing unless improperly packed for transit. For these reasons, the product should enjoy low freight rates, even though the item has a season use. The rates can be increased if the description as proposed goes into the Classification. Mainly due to the zeal of someone in telling of the additional uses of the "protector."

The protectors are proposed to be listed as "miniature hot-house" based on these facts: "The item is put over plants for protection, however, it has additional uses in that it germinates the seeds (in transit) plus giving the plant the advantages of hothouse protection." The "additional uses" will furnish carriers an idea the rating on the product should be higher. This is done by proving the product has higher valuation, they are more than protectors, they are "protectors-plus additional uses."

There are over 130 items in the Classification that the Board has proposed ratings as follows:

Less than 6 pounds per cubic foot, less-than-truckload, Class D1 (double the first class rate); on truckload, Class 1 (100 percent or the first class rate), subject to Rule 34's minimum weight factor 10.1 (10,000 pounds, dependent upon the weight column used by trucker in the rule).

Six pounds per cubic foot or over but less than 12 pounds per cubic foot, less-than-truckload, Class 1 (100 percent); truckload, Class 2 (85 percent); mwf 20.1 (20,000 pounds).

Twelve pounds per cubic foot or over but less than 15 pounds per cubic foot, l.t.l., Class 2 (85 percent); truckload, Class 3 (70 percent); mwf 24.1 (24,000 pounds).

Fifteen pounds per cubic foot or over, l.t.l., Class 3 (70 percent); t.l., Class 4 (50 percent); mwf 24.5 (24,000 pounds).

Justification—The articles when not compressed or fully compressed are light and bulky. Present method of classifying does not produce results comparable to other articles of a light and bulky nature, some are presently rated in compliance with orders of the ICC. Generally these proposals follow the pattern established by the ICC in "Paper Excelsior," 44 MCC 531.

Among those 130 items are articles conveyed in transit where paper wrappings, containers and other paper products are used. In the list are all types of bags with paper linings, insulated, and/or multiple-wall of several plys, padded. The items cover the products of many industries, including the paper industry and products used by the latter industry.

Not all the products in the Classification are rated the same. If the Board has no protests to using the same rating and weight for those now rated differently, the result will be many paper products now moving on lower rates and weights will be higher.

CANADIAN NOTES

Can. Sets New Depreciation Ceilings

OTTAWA — The new Canadian Government's income tax regulations establishing minimum annual depreciation and depletion allowances on property under Schedule B, Class 5, includes deduction of 10 per cent for an integrated pulp and paper mill, comprising mill buildings, machinery and equipment, though not including hydro-electric power plants and their equipment, and also including a sulphite, sulphate or ground wood pulp mill, comprising buildings, machinery and equipment, but not involving hydro-electric power plants and their equipment.

According to the same schedule Class 15, forest lands acquired for the purpose of removing merchantable timber can be depreciated 100 per cent after all the timber is removed if these lands are of no further use to owner.

In comparison to the above, U. S. Treasury schedule F, estimates the depreciation rates as follows:

Sulphite Mills	5.0 %
Sulphate Mills	5.88
Groundwood Mills ...	4.55
Various Types of Paper Mills	3.75–5.75

Canada Outlook

TORONTO, Ont.—A review of the outlook for pulp and paper during 1950 finds uncertainty of international trade conditions, due to currency difficulties, clouds the non-dollar export picture considerably. But for newsprint it is expected that a scramble for limited Scandinavian supplies will make it necessary for some foreign buyers to return to Canada to replace markets now being lost, notably the United Kingdom and Australian markets.

Competition between foreign and domestic pulp and paper producers in 1949 has been keen and has affected some prices, but the demand for newsprint has remained strong due to continuing high consumption levels in the United States and despite a decline in the sterling area business.

Pulp prices, hard hit earlier in the year, have firmed somewhat and are expected to remain at current levels for the first quarter of 1950 at least. Newsprint prices should remain firm for some time yet, with production at or only slightly below capacity. Canadian dollar devaluation has given newsprint producers an additional 10 percent premium on export sales, which should improve earnings.

Fine paper prices are said likely to be firm for the first part of 1950, with sales improved in the domestic market

since the termination of the lithographers' strike. Export business is at a low level and does not show any signs of improving.

Canada's Employment Situation

OTTAWA — While unemployment in Canada is reaching the highest level since the war, it is described as serious, but not alarming. One of the most serious cases being found in logging where employment of seasonal workers has decreased because of the loss of foreign trade. Such workers are not protected by Canada's unemployment insurance scheme and hence are providing a difficult problem.

FOREIGN NOTES

Britain Ends Many Import Quotas

LONDON, England—The British Government on December 15 reported it was wiping out import quotas on a long list of raw materials and manufactured goods which it buys from other European nations. Harold Wilson, president of the Board of Trade, told the House of Commons most of these items now may be imported without restriction starting next January 5.

Wilson also told the House that magazines and other periodicals—now limited to 70 percent of their prewar paper consumption — may "use all the paper they can obtain" starting March 1.

The removal of this restriction does not apply to newspapers. They receive enough newsprint to publish about six standard-sized pages daily.

Wilson said the loosening of import curbs is in response to an appeal by the Office of European Economic Co-operation.

The OEEC suggested in a resolution on November 2 that quotas should be wiped out by December 15 on at least 50 percent of food, feeding stuffs, raw materials and manufactured goods. The OEEC consists of the nations which are taking part in the European recovery plan.

Irish Imports of Paper

DUBLIN—In the first nine months of 1949, imports classified as paper, cardboard, etc., entering the Republic of Ireland were valued at £2,443,599 as against £2,494,846 in the corresponding period of 1948.

Of these imports, paper-making materials amounting to 8,154 tons accounted for £210,248 in the 1949 period and to 7,071 tons for £238,910 in the first nine months of 1948.

Imports of coated printing paper during the 1949 period amounted to 10,539 cwts., valued at £53,401, the figures for the 1948 period being 9,855 cwts., valued at £60,279.

Newsprint imports during the first nine months of 1949 were 280,973 cwts., valued at £555,648 as against 177,222 cwts., valued at £324,216 in the corresponding period of 1948; and of other uncoated printing paper, 34,807 cwts., valued at £117,887, as against 43,734 cwts., valued at £205,212 in the 1948 period.

Imports of writing paper in large sheets were 12,486 cwts., valued at £48,100 in the first nine months of 1949 and 10,826 cwts., valued at £52,251 in the corresponding period of 1948.

Other classifications of imports in this group, published in the *Trade Statistics* issued by the Central Statistics Office in Dublin, include:

Article	Value Jan.-Sept., 1949	Jan.-Sept., 1948
Packing and wrapping paper	£17,308	£39,017
Tissue paper	£13,577	£19,902
Oiled, waxed and other waterproof paper	£16,408	£38,161
Cigarette paper	£45,062	£40,519
Greaseproof paper	£24,407	£32,024
Imitation parchment	£37,923	£55,440
Gummed paper	£19,934	£21,353
Wall and ceiling paper, printed	£29,374	£45,609
Cellulose wrapping paper	£115,922	£51,370
Other paper	£61,313	£67,855

The above figures exclude stationery.

Empty containers of cardboard, etc., and parts, imported during the first nine months of 1949 were valued at £157,024, as against £115,559 in the corresponding period of 1948.

Imports of strawboard, not worked and not corrugated, were valued at £73,266 in the 1949 period and £72,976 in the like period of 1948.

Other cardboard in the piece valued at £417,560 was imported in the first nine months of 1949, and at £538,210 in the corresponding period of the previous year.

In the first nine months of 1949, £189,518 worth of paper, cardboard, etc., was exported from the Republic of Ireland, the value for the 1948 period being £164,264.

Re-exports of these commodities during the nine months under review were valued at £2,229 compared with £5,265 in the corresponding period of 1948.

* * *

In October, 1949, the Republic of Ireland imported paper and cardboard, etc., to a total value of £316,949 as against £267,017 in October, 1948. This makes a total import value of £2,760,548 for the first ten months of 1949, as against £2,761,863 in the corresponding period of 1948.

Of the October, 1949, imports, paper-making materials amounted to 1,684 tons, against 8 tons in October, 1948.

Newsprint imports rose from 40,525 tons in October, 1948, to 55,961 tons in October, 1949.

* * *

Asked in the Dail, on December 6, whether he had received representations about the refusal of Irish paper and paper-bag manufacturers to supply on wholesale terms to new firms, Mr. Morrissey, the Minister of Industry in the Republic of Ireland, said that he had and that all the cases reported were taken up with the trade associations concerned which were not prepared to facilitate new entrants. Those cases would not be overlooked in the consideration of restrictive trade practices which he is undertaking.

* * *

What almost amounted to prohibition of imports would be necessary to protect adequately the interests of a company manufacturing only for the home trade, said A. F. Buckley, chairman, at the annual meeting of Wallpapers, Ltd., held in Dublin.

The report for the year ended July 31, he said, showed a serious loss on the company's operations amounting to £8,896, as a result of which it was not possible to pay the dividends on the preference and "A" preference shares.

The company had experienced good sales since February. These were continuing and, in addition, they had now undertaken to produce a new pattern book set of wallpapers. He felt that, with the proper protection of their goods here, the company had a good future.

Following this meeting, a letter was published in the Irish newspapers from H. Ashton, the acting honorary secretary of the Dublin and Provincial Wallpaper Trades' Association, in which he said that the uninformed might be led to believe that the wallpaper industry was languishing for lack of protection.

On the contrary, wrote Mr. Ashton, for twelve years it had been Ireland's most benevolently protected industry, one which enjoyed the protection of an import duty which, in some cases, rose to over 700 percent. In many instances, the poor man paid pro rata up to sixteen times the amount of duty contributed by his more fortunate neighbour. This was at a time when all other sections of the printing trade were doing very nicely with an ad valorem duty of 50 percent.

In wallpaper printing, however, there had been no progress despite this protection. In fact, the range available to traders was only half what it was when the Kildare mill was established. For twelve years traders in all parts of Ireland, for many of whom wallpaper constituted their only means of livelihood, had submitted to impositions and restrictions which had reduced the rollage handled by more than one-third, with consequent loss and unemployment in the distributing and decorating trades.

The traders fully understood and sympathized with the efforts of the Government to establish a wallpaper printing industry, but they felt that an ad valorem duty of 50 percent should be adequate to provide an equitable safeguard of the interests of all parties, especially as the full technical advice of the British combine was, they assumed, available to the Kildare mill.

LITERATURE

American Cyanamid Co., 30 Rockefeller Plaza, New York 20, N. Y. Book, revised edition, illustrated, 64 pp., "Products and Services of American Cyanamid Company for Industry and Agriculture." Describes the products and services offered to industry, agriculture and mining. Outlines the divisional structure through which such products are sold.

Beaver Pipe Tools, Inc., 310C Dana Avenue, Warren, Ohio. Bulletin, "Beaver Model-C Portable Power Units." Information contributed by users of the machine as to the effect of the unit on their operations. Highlights its versatility when applied to operations unrelated to pipe threading.

Electric Machinery Mfg. Co., Minneapolis 13, Minn. Bulletin 2209-PRD-196, "Your E-M Guide to Profitable Installations of Modern Generators." Recent installations of large slow-speed engine-type generators are featured.

Engineering College Research Council of the American Society for Engineering Education, State University of Iowa, Iowa City, Iowa. Book, "1949 Review of Current Research and Directory of Member Institutions." Provides detailed information on engineering research in progress in colleges and universities. Price $1.75, 180 p.

Fischer & Porter Co., Hatboro, Pa. Catalog 62, "Feed-Rator Chemical Feeder." Covers operation, installations and specifications of the feeder.

Filtration Engineers, Inc., 135 Oraton St., Newark 4, N. J. Illustrated Booklet, "FEinc Continuous Filtration." Supplies technical data on the FEinc Rotary Vacuum Filter, and Pilot Plant Filter.

General Electric Co., Apparatus Dept., Schenectady 5, N. Y. GEC-565, "Temperature Indicators and Accessories." For industrial and laboratory use. Includes diagrams, specifications and pricing information.

The Glassine and Greaseproof Mfrs. Assn., 122 East 42nd St., New York 17, N. Y. Booklet, "Glassine and Greaseproof: The Wonder Papers for Protective Packaging."

The B. F. Goodrich Co., Akron, Ohio. Bulletin, "Static Conducting Vee Belts."

Graver Water Conditioning Co., 216 West 14th St., New York 11, N. Y. Bulletin, "Two-stage Deaerating Heaters." Outlines the principles of deaeration and illustrates operation of the equipment.

General Dyestuff Corp., 435 Hudson St., New York 14, N. Y. Circular GDC-293 "Gallicide for Slime Control in Paper Mills."

Goulds Pumps, Inc., Seneca Falls, N. Y. Bulletin 725.3, "Goulds Stainless Steel Centrifugal Pumps." Technical data and diagrams on pumps designed for handling corrosive liquids.

General Electric Co., Schenectady 5, N. Y. Illustrated Bulletin, GEA—5233, "Telemetering Systems." Detailed information on use of this equipment for electric power distribution and industrial applications. Also bulletin, GEA-5401, "Tri-Clad Single-Phase Capacitor Motor." Motor."

Gardner Laboratory, 4723 Elm St., Bethesda, Md. "Physical and Chemical Examination of Paints, Varnishes, Lacquers and Colors." Gives information on new methods of test, new instruments with colored illustrations.

Hardinge Mfg. Co., 240 Arch St., York Pa. Bulletin AS-400, "Patterns, Castings, Machine Shop Work, Plate Steel Work, Custom-Built Machinery." Bulletin No. 48, "Pressed Steel Turntables." Sales copy with illustrations and specificatio.

Hercules Powder Co., Wilmington, Del. Folder, "Paracol, a Hercules Wax Emulsion for Paper and Board." Describes the three stability classifications of Paracols and their use internally or in surface application in the manufacture of paper and paperboard.

Hyster Co., 2902 N. E. Clackamas, Portland 8, Ore. Catalogue, "Attachments, Tools & Accessories for Hyster Lift Trucks, Hyster Karry Krane, Hyster Straddle Trucks."

Hanchett Mfg. Co., Big Rapids, Mich. Bulletin, "G. K. Knife Grinder with the New Electrically Controlled Table Drive Mechanism." Shows use in paper and other processing industries.

The International Nickel Co., Inc., 67 Wall Street, New York 5, N. Y. Bulletin, "How to Get More Production from Doctor Blades." Based on service records from pulp and paper mills.

Improved Paper Machinery Corp., Nashua, N. H. Bulletin, "Pulp Handling Equipment." Sales copy and illustrations of all equipment. Highlights important new items: Waco filter, thick stock pump, and the Dunbar chipper.

M. B. Jenkins' Sons, Inc., Cedar Grove, N. J. Bulletin No. 10. "Jenkins Metlkor Brushes." Guide for brush selection, with photos and descriptions of brushes for applying, arranging and removing.

Keystone Lubricating Co., 21st and Lippincott Sts., Philadelphia 32, Pa. Form C 10L, "Keystone Specialized Lubricants." Application guide presenting their line of lubricants for industrial and automotive machinery.

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AMERICAN PAPER AND PULP ASSOCIATION'S PAPER PRODUCTION RATIO REPORT

(Production as per cent of six-day capacity)

COMPARATIVE WEEKLY SUMMARIES

Current Weeks—1949		Corresponding Weeks—1948	
November 19	98.5	November 20	99.4
November 26	95.1	November 27	93.0
December 3	100.2	December 4	95.4
December 10	100.5	December 11	98.2
December 17 (Revised)	98.4	December 18	95.9
December 24	87.2	December 25	74.6

COMPARATIVE MONTHLY SUMMARIES

1948						1949	
Jan.	100.1	May	100.5	Oct.	99.1	Jan.	94.6
Feb.	99.8	June	95.7	Nov.	97.1	Feb.	92.8
Mar.	100.8	July	85.3	Dec.	87.1	Mar.	89.1
Apr.	100.8	Aug.	96.8			Apr.	85.1
		Sept.	91.8	Year Avg.	96.2	May	82.7
						June	78.6
						July	72.8
						Aug.	‡88.0
						Sept.	‡90.3
						Oct.	‡98.0
						Nov.	‡98.4

‡ Preliminary.

COMPARATIVE YEARLY SUMMARIES

	1942	1943	1944	1945	1946	1947	1948	1949
Year to Date	90.4	87.8	88.1	89.7	101.4	104.9	96.7	88.9
Year Average	90.4	87.8	88.1	89.4	101.1	104.3	96.2	

PAPERBOARD' OPERATING RATIOS†

Current Weeks—1949		Corresponding Weeks—1948	
November 19	94	November 20	97
November 26	90	November 27	89
December 3	93	December 4	93
December 10	96	December 11	96
December 17	92	December 18	96
December 24	92	December 25	87

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year Avg.
1948	99	100	102	102	100	94	81	92	91	96	94	84	95
1949	88	85	79	79	78	75	64	86	87	94	93		

All of the above data is based on tonnage reported to American Paper and Pulp Association. Does not include mills reporting to National Paperboard Association, except in isolated cases where both paper and paperboard are produced and separate tonnage figures are not readily available. Does not include mills producing newsprint exclusively.

† Per cents of operation based on "Inch-Hours" reported to the National Paperboard Association.

OBITUARIES

Isaac Collins, 75, founder of National Waterproof Papers Inc. died at his home in Haddonfield, N. J. on December 26. Mr. Collins was formerly Sales Manager of Dill & Collins, Inc., paper manufacturers of Philadelphia. He founded National Waterproofing Co. in 1903, and was connected with that organization until his recent retirement.

Robert Stewart, 72, former general superintendent of the machine shop of the Bagley & Sewall Co., died December 29. He was associated with the company for 41 years until his retirement in 1940. Mr. Stewart had charge of the erection of paper-making machines prior to being named general superintendent.

Sewell T. Jamison, 67, assistant superintendent of the Newark, Del., plant of the National Vulcanized Fibre Co., died on December 31 in the Wilmington General Hospital, Wilmington, Del. Mr. Jamison had been associated with the paper making industry in the Wilmington area for 50 years. He was employed by the Jessup and Moore Co., the Rockland Mills and other paper mills in Delaware before joining the fibre company. He is survived by six sons, two daughters and a sister.

Clifford D. Prickett, 86, former vice-president and director of the Hercules Powder Co., Wilmington, Del., died on December 29. Mr. Prickett was one of the organizers of the Hercules Powder Co., in 1912. He is survived by two children, Stanley G. Prickett and Mrs. Carolyn P. Diver.

Ernest Harmon "Bob" Williams, 79, president and founder of Williams-Gray Co. died in Beverly Hills, Calif. on December 17. Mr. Williams was associated with the paper industry for over 50 years. Before the turn of the century he was agent for the sale of Meginticook paper machine felts and shortly after was sulphite pulp salesman for the Burgess Sulphite Co., now the Brown Co., Berlin, N. H. In 1908, together with J. Frank Gray and D. C. Everest he formed the Williams-Gray Co. in which he was active until his death.

Mrs. Frank C. Ash, wife of the president of the Oswego Falls Corp. died on December 31 at her home in Fulton, N. Y. Besides her husband she is survived by three daughters and five grandchildren.

John R. King, 28, president of the Rex Paper Co. was killed early on the morning of December 29 when his automobile left the road and overturned ten miles east of Kalamazoo, Mich. Mr. King was the son of Mrs. Helen R. King, chairman of the board and manager of the Rex Paper Co., and the late Merrill B. King. He became affiliated with Rex in 1941, a firm which his grandfather, John F. King established nearly forty years ago, and of which his late father was president. He was also an official of the John King Manufacturing Co. which was established to manufacture paper novelties and equipment which had been invented by his grandfather.

MISCELLANY

Connecticut River Project

HOLYOKE, Mass.—The proposed $32,000,000 Connecticut River navigation and power project, designed to open up the river as far as Holyoke, is "a necessity if New England industry and standards are to survive," H. A. Whitcomb, chief of the river and harbor operations division, New England division, Corps of U.S. Army Engineers, recently told paper manufacturers here. "Opening up the upper river to navigation will in all probability result in a much greater transformation of this area than any of us conceive," he said. "The Connecticut River will become a more important link in the transportation network that is the life blood of our modern living. Projects of this nature are a refutation of the conception that New England is a dying area, living in the past, a relic of the horse and buggy era."

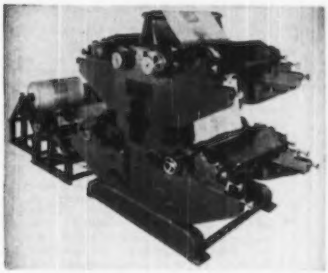
Mr. Whitcomb reported that the cost of the navigation features is estimated at $13,500,000 and the power development at $18,500,000. Included would be a 12-foot channel from Hartford to Holyoke with a turning basin at Holyoke, a dam and navigation lock at Enfield, raising certain bridges to allow a minimum vertical clearance of 20 feet, and a power plant at the dam. Benefits are expected to amount to about twice the cost involved.

Propose Federal Study of Streams

BOSTON, Mass. — James C. Richdale, re-elected president of the New England Council, reported the group will support a bill proposed by U.S. Senator Henry Cabot Lodge, Jr., (R-Mass.) for a detailed study by Army Engineers and the Federal Power Commission of New England's water resources. Last year the council issued a report in which it estimated that the undeveloped hydro-electric potential in New England amounts to approximately 500,000 k.w. The Federal Power Commission later countered with an estimate that more than 3,000,000 k.w. could be developed in the area. Richdale said support of Lodge's bill "signified no lack of confidence in our committee and its engineering report, but rather our desire that the people of New England be made satisfied in one way or another as to the facts."

Catlin of Riverside Made Bank Director

NEENAH, Wis.—John B. Catlin, vice-president and director of the Riverside Paper Corp., has been elected a director of the First National Bank.



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Exceptional sales opportunity exists for a man with a solid knowledge of the mechanical requirements of the Pulp and Paper Industry. Familiarity with the processing equipment involved in the Pulp and Paper field is essential; also some technical knowledge in the design of such equipment would be helpful. The man selected should have a successful sales record and should be well known in the industry. Your reply, which will be kept confidential, should give full information. Salary open. All replies will be acknowledged. Box 50-13 care Paper Trade Journal. J-5

WANTED

Machine Tenders

Back Tenders

Thoroughly experienced in manufacturing of quality folding box board.

Steady job, one machine mill, located Northern New Jersey.

In reply, state age, experience and full details.

Address Box 50-3, Paper Trade Journal. J-12

Established dyestuff concern seeking aggressive salesman well connected in the paper mill trade. Write stating qualifications. Box No. 50-12, care Paper Trade Journal. J-5

CHEMIST

Our Paperboard Mill, specializing in the manufacture of folding grades, is seeking an experienced chemist to assist in controlling formulae and improving our quality. An exceptional opportunity is offered to the right man. In your reply give complete background of experience and your desired compensation. Address Box 50-5, care Paper Trade Journal. J-19

HELP WANTED

MEN WANTED Positions Open

Paper mill executive for special position, $8,000-$12,000; night supt. converting plant; controller, $10,000-$12,000; supt. board mill, $8,000-$10,000; supt. Cylinder machine tissue mill; two superintendents for tissue and light weight paper mills; night supt. book and offset papers; asst. supt. kraft specialty paper mill.

Color man familiar with all grades kraft specialties to take charge beaters and color matching; night foreman Cylinder board mill; chemists and chemical engineers.

Mechanical engineers; machine designers; draftsmen and chief draftsman; plant engineers and master mechanics, salaries $5,000-$9,000 year; machine tenders and back tenders.

Chemist with paper mill experience for technical service and development work on chemicals and specialties; position near New York City.

We invite correspondence (confidential) with paper mill executives qualified to earn from $7,500-$20,000 a year. Many attractive openings open right now in the paper industry.

CHARLES P. RAYMOND SERVICE, Inc.
294 Washington Street, Boston, Mass. J-5

WANTED

Superintendent for 1 machine mid-western mill making high grade folding box board. Capable, seasoned man both cost and quality conscious, interested in permanent connections. Replies will be kept in full confidence. Box No. 49-597 care Paper Trade Journal. NC

Plant Engineer: Graduate Mechanical Engineer to take charge of development and maintenance departments in a New England converting mill specializing in Coating, Waxing, Gumming and Printing of paper and film. Knowledge of printing equipment desirable. In replying give full details as to qualifications, Age, experience and salary requirement. Address Box 50-4, care Paper Trade Journal. J-12

LARGE PAPER MACHINERY MANUFACTURER interested in securing services of erecting supervisor for shop and field work. In reply state age and experience. Address Box 50-9 care Paper Trade Journal. J-19

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SALARIED POSITIONS $3,500—$35,000

If you are considering a new connection communicate with the undersigned. We offer the original personal employment service (40 years recognized standing and reputation). The procedure, of highest ethical standards, is individualized to your personal requirements and develops overtures without initiative on your part. Your identity covered and present position protected. Send only name and address for details.

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TF

SUPERINTENDENT for one machine board mill in the east. Unusual opportunity for capable papermaker having experience in high grade specialty boards and patent coated specialties. Some sales experience desirable but not essential. State age, experience, qualifications and salary expected. Replies will be held strictly confidential. Address Box 49-602 care Paper Trade Journal J-12

ELECTRICAL ENGINEER

Fox River Valley (Wis.) paper mill wants electrical engineer experienced in all phases of maintenance and layout. Give complete personal and business history in letter of application. Write Box 49-622, care Paper Trade Journal. J-19

BEATER ENGINEER—Unusually high compensation for man experienced in all folding boards to assume supervisory capacity in one-machine mill. Address Box 49-600 care Paper Trade Journal. J-5

MACHINE TENDER—Fully experienced on all folding boards. Good steady job with excellent opportunity in one machine mill. Address Box 49-599 care Paper Trade Journal. J-5

WANTED FOR NEW MILL starting in the South—3 Fourdrinier Machine Tenders for machine using pickup felt—4 Cylinder Machine Tenders for 10½# tissue and waxing. Address Box 49-623 care Paper Trade Journal. J-5

ASSISTANT TO GENERAL SUPERINTENDENT—Four machine tissue mill, Fox River Valley, Wisconsin. Machine experience required. Address Box 49-614 care Paper Trade Journal. J-19

WANTED—2 Machine Tenders, 2 Back Tenders, 2 Third Hands, 3 Beater Engineers experienced on Fourdrinier Tissue Machine, 7 day week. Good rates. Steady. New England Mill. Address Box 50-10 care Paper Trade Journal. J-5

RATES FOR CLASSIFIED ADVERTISING

HELP WANTED—10c a word. Double rate for heavy face type. Minimum charge $2.50.

SITUATIONS WANTED—10c a word, double rate for heavy face type. Minimum charge $2.50. If repeated ½ rate will be charged for each consecutive repetition.

FOR SALE—10c a word. Double rate for heavy face type. Minimum charge $2.50.

WANTED—10c a word. Double rate for heavy face type. Minimum charge $2.50.

OPPORTUNITIES—10c a word. Double rate for heavy face type. Minimum charge $2.50.

Classified advertising space may also be purchased at $5.00 per single column inch. All classified advertisements are payable in advance. If box number is used—70 cents additional.

Address replies to advertisements appearing under Box Numbers in care of PAPER TRADE JOURNAL, 15 West 47th Street, New York 19, N. Y.

HELP WANTED

MACHINE TENDERS experienced on Fourdrinier tissue machine, steady, good working conditions, excellent opportunity, Southeastern. Address Box 50-6 care Paper Trade Journal. J-5

SITUATIONS WANTED

TECHNICAL EXECUTIVE — Aggressive young man with 18 years background in research, practical papermaking, board and production management, is seeking midwest mill connection requiring responsible and intelligent assistance. Address Box 49-604 care Paper Trade Journal. J-5

FOREMAN of small varied bag specialty plant, long experience, technical background, complete know how, desires change with heavy responsibilities. Address Box 49-615 care Paper Trade Journal. J-19

PRODUCTION MANAGER or General Superintendent. Wide experience in the manufacture of Cylinder Products including specialties where quality counts. Can duplicate or develop new grades on a successful commercial basis. Address Box 50-2 care Paper Trade Journal. J-19

PLANT MANAGER—Board and Paper Conversion; employed; seeks opportunity in company needing cost-minded executive with proven production record and excellent labor relations history. Address Box 50-8 care Paper Trade Journal. J-26

FOR SALE

CURRENT OFFERINGS

58" Finley Single Knife Sheeter.
82" Hamblet Sheeter with Layboy.
No. 9 Cameron Slitter.
3-color Rotary Web Press, 60" cyl.
55" 9-roll Super Calendering Machine.
Model 145 Economy heavy duty Baler.
32", 38", 40" and 44" Power Cutters.
NEW Back-Stands, made to special order.
Motors—from fractional to 30 H.P.

THOMAS W. HALL COMPANY, Inc.
120 West 42nd St., New York 18.
(Plant at Stamford, Conn.)
TF

FOR SALE

1—P & H MODEL 855-B CRANE G.M. DIESEL POWER, KOHLER ELECTRIC LIGHT PLANT, 70 FOOT BOOM. MACHINE NEW IN 1946 AND HAS HANDLED ONLY PULPWOOD IN ONE LOCATION. SPLENDID CONDITION.
1—HAYWARD ⅝ CORD PULPWOOD GRAPPLE—NEW.
2—OWENS NO. 96 R.C. ⅝ CORD PULPWOOD GRAPPLES.

Write Box 49-605, care Paper Trade Journal. J-5

PAPER COATING MACHINERY MANUFACTURERS — Waxing, Oiling, Carbon, Laboratory Coating and Treating Machines. New improvement. MAYER MACHINE COMPANY, Inc., 1313 Buffalo Road, Rochester 11, N. Y. TF

FOR SALE—One 5 ft. x 8 ft. Impco Vacuum Sludge Filter, new in 1941. Frank H. Davis Company, 175 Richdale Avenue, Cambridge, Massachusetts. J-19

FOR SALE

1—Paper Converting Machine Co. 4-Web Dispenser Type Napkin Folder. Production 100M per Hour.

1—Paper Converting Machine Co. ¼ fold, 2 web napkin folder with embossing attachment, Extra Embossing rolls.

CAMERON SLITTERS

1—40" Model 4-B.

1—42" Type 26, Model 2A.

1—42" Type 40-T.

1—50" and 1—60" Type 28, Model 3D.

1—52" Type 8-S.

1—62" and 1—65" Type 9.

1—62" Type 10-S.

1—42" and 1—62" Universal Type 6.

1—72" Type 10—Model 11.

1—72" Type 10, Model 5.

1—82" Johnstone, Fourteen slitter and rewinder. New.

1—48" Inmac Board Slitter and Rewinder Rewinds 48" diameter rolls.

1—40" Kidder Late Type Model SL Slitter & Rewinder. Reconditioned and guaranteed.

1—40" Langston Type A Shear Cut Slitter & Rewinder.

1—40" Model C Fales, Knife set-ups for ¾", 74" and 20 Adiustable Cutters. 5 HP A.C Motor equipment.

1—32" Johnstone Type 12 Slitter & Rewinder. New For narrow slitting down to ¼".

Power Paper Cutters: 5—Seybold—1—40" & 1—50" 10Z. 54" Holyoke. 1—74" 20th Century 84" 2-H. 5—Oswego—34", 44", 50", 57" and 68". White—1—40", 2 Acme 12" and 42". Sheridan—1—65".

2—S&W Undercut—63" and 92".

3—Potdevin Flat & Square Bag Machines. Models 292, 294 and 391.

1—Nasko High Speed Flat & Square Bag Machine. Complete and in A-1 condition. Large range of formers and gears.

1—48" German Dornbusch Embossing machine with two sets of embossing rolls

1—50" Hudson-Sharp Model 8E Embosser. With two sets of embossing rolls.

3—Model 30 Potdevin 30s Grocery Bag Machines. Range 1 to 10 lbs., inclusive.

1—72" and 1—81" Hamblet Rotary Sheet Cutters with slitting attachments, automatic layboys, and 12-roll double deck backstands.

1—62" Dillon Duplex Rotary Sheet Cutter With Slitting attachment and 24-Roll Double-Deck Backstands.

2—81" Dietz Toilet Paper Perforators. Sheets 4½ x 4½ and 4½ x 5 and paper towels perforated 7½ and 13½".

1—41" wide 3-color roll to roll Former Standard Type Wolverine aniline printing press. Complete with Reeves Drive and A.C. motor equipment, practically new.

2—#1 Dilts Hydrafiners. With flexible couplings for direct connection to motors.

2—Bird Screens. One 3A and one 2A.

1—30" x 72" IMPCO Cylinder Mould.

2—12" x 12" Beloit Triplex Plunger Stock Pumps.

5—Ten Plate Packer Screens.

1—Knapp, Model K.W. Napkin Wrapping Machine.

Refiners—1—Weiner, 1—Shartle.

GIBBS-BROWER COMPANY, INC.
21 East 40th St., New York 16, N. Y.
J-5

FOR SALE

FOR SALE

1—E. D. Jones Batch Beater, Roll 54" diameter x 52" face, 1200 lb. capacity, steel tub, connected to a 100 H.P. reliance slip ring motor, 580 RPM, 440 Volts with a V belt drive complete.

1—100 H.P. Westinghouse 450 RPM slip ring, 440 Volts.

1—150 H.P. G.E. Syncronous motor, 600 RPM, 440 Volts.

1—Flynn and Emerick Stoker complete with grates, fan, motor, and controls. New, never installed. All the above in good condition. Reply, International Felt Corporation, 121 South Broad Street, Philadelphia 7, Pennsylvania. J-12

CHESTNUT WET LAP FOR SALE

8 Air Dry Tons per day of pure chestnut wet lap 60% air-dry. Available for immediate shipment. Write for details and sample.

CHAS. A. SCHIEREN COMPANY
Bristol, Virginia J-5

FOR SALE—Model B Cleveland Folder with suction pile feeder, new 32 page attachment, and A.C. Motor. Wonderful outfit. Address Box 49-613 care Paper Trade Journal. J-5

FOR SALE—48" Kidder and 32" Cameron Model 24-3A Slitters, both complete with A.C. motors. Address Box 49-612 care Paper Trade Journal. J-5

FOR SALE—New 64" Maier Rotary Cut-Off Knife, cuts 32" to 120" sheet lengths up to ¾" thick board; new 100" Knowlton Bar Creaser with 4 crease widths. GREGGORY, INC., 203 No. Wabash Ave., Chicago, 1, Ill. TF

WANTED

PAPER MILL WANTED

Mill having cylinder or Fourdrinier Machines with buildings or land nearby for large converting plant. Prefer location in New England. Address Box 49-596 care Paper Trade Journal.

J-5

WANTED—SOLVENT WASTES

Of All Kinds
Will *Redistill or Purchase*
Also Surplus

Chemicals—Dyes—Pigments—Oils, etc.
By-Products, Residues, Equipment

CHEMICAL SERVICE CORPORATION
86-04 Beaver St., New York 5, N. Y.
J-5

WANTED—Brightwood Box Machine. Address Box 50-17 care Paper Trade Journal.

PAPER MANUFACTURER desire to purchase or invest in converting business of standard paper products. Address Box 50-16 care Paper Trade Journal. TF

FOR SALE

FOR SALE

FOR SALE

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A.C. & D.C. GENERATORS

1—150 KW West. SK 125 v. 1200 RPM.
125 KVA 220/3/60 277 RPM West.
150 KW Triumph 250 v. cp.wd. 600 RPM.
150 KW G.E. 550 v. 1100 RPM cp.wd.
1500 amp. 60 v. West. SK Generator
1000 amp. 60 volt Westgh. SK Welding Gen.

M-G SETS—R. CO.

450 KW G.E. 250/125v.—710 HP Syn. 2800/3/60
250 KW West. SK 250 v.—2300 v. Syn.
100 KW West. 125 v. SK—150 HP Ind.
100 KW West. 250 v.—150 HP Syn. 220/440/3/60
35 KW G.E. 125 v.—50 HP G.E.
10 KW 125 v.—15 HP Master 220/440.

AIR COMPRESSORS

1875 CFM. 100 #PRE 2-I.RD. dir. con. 265 HP Syn. 2300/3/60 with 4-step unloader.
755 CFM. Chic. Pneu. two stage Belted. 100 lbs.
356 cfm 100# Chic. Pneu. 12 x 10 Belted.
245 cu. ft. Ing. Rand belted ERI. 100 lbs.

AC MOTORS (3 ph. 60 cy.)

HP	Make	Wdg	Spd.	Type
500	G.E.	S.R.	450	I M
300	G.E.	S.R.	450	I M
300	West.	S.R.	600	CW
150	G.E.	S.C.	600	IK
150	G.E.	Syn.	600	ATI
150	G.E	S.C.	695	KT562Y
150	Westgh.	Syn.	450	3 Brg.
150	West.	S.C.	500	CS
125	West.	Syn.	277	
120	Cr. Wh.	S.R.	290	
100	G.E	S.R.	450	I M
75	West.	S.C.	865	MS
60	West.	S.C.	1160	CS505
50	A.C	S.C.	1750	
50	Al.Ch.(new)	S.C.	(Hi-Torq.)1130	
35	G.E.	S.C.	1150	I K
30	Vert. G.E	S.C.	1150	KT526
30	Al. Ch. (new)	S.C.	(Hi-Torq) 1685	ARH
25	G.Wh.	S.C.	880	SC504
25	500 v. West.	S.C.	1750	CS365
25	Cr.Wh.	S.C.	865	
25	Cr.Wh.	S.R.	580	1210
20	Al. Ch. (new)	S.C.	(Hi-Torq) 1685	ARWHH
20	West.	S.C.	1750	CS343F
15	West	S.C.	1750	CS326
15	L.A.	S.C.	3600	Fr. 324
10	West.	S.C.	570	CS566C
10	West.	S.C.	870	CS464C
10(5)	West.	S.C.	1200	CS370C
10	West.	S.C.	1750	CS371G
7½	Comm.	S.C.	865	P326
7½	West.	S.C.	3440	CS254Y
5	West.	S.C.	565	CS546
5	West.	S.C	150	254
5(2)	West.	S.C.	1200	CS
5/15	L.A.	S.C.	500/1600	2558
5	Master	S.C.	1125/37	PA
5	Burke	S.C.	420	EM2
3	West.	S.C.	1100	CS
3	West.	S.C.	1750	
3	West.	S.C.	600/1200	CS324
2	West.	S.C.	1750	CS224
2	550v.West.	S.C.		

AC MAGNETIC STARTERS (3 ph. 60 cy.)

2—700 HP West. 2300 v. Syn. Line Starters.

TRANSFORMERS

6—75 KVA. G.E. 2300v-115/230v.
3—100 KVA G.E. 2300v.—230/460v.
3—150 KVA. G.E. 2300v.—230/460v.

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We have purchased and offer the following:

1—156" Beloit Fourdrinier with Voith inlet, 70 ft. wire, Millspaugh suction roll, 2—Presses, 40 dryers 48" dia. double deck frames, 2 dryer felt dryers 36" dia., all equipped with Sheehan rope carriers, top and bottom dryer felts, New Johnson joints, New base plates. 1—8—roll Calender Stack, New Lobdell rolls used less than 6 months. Beloit 2—spool reels, winder, 7—Marshall drives with lineshaft and matching pulleys driven by 230 H.P. Terry Turbine. All above fully rebuilt and operated less than 6 months.

Beaters, jordans, Pumps, Motors also 2 New 200 H.P. Type V.L. Boilers with F.H. Type stokers, new in 1948. The above now installed in building 322 ft. long, 126 ft. wide with 8 acres land on R.R. siding, located Middle West, all available for immediate possession, or will sell machinery separate. The best buy in my 25 years paper machinery business.

MARK OSBORNE

OSBORNE PAPER MILL CO. **Fulton, N. Y.**

J-5

WANTED

WANTED

Heavy duty, double cut-off mill sheeter sixty inch face, Address Box 50-14, care Paper Trade Journal. **J-26**

WANTED—W & P Shredders, Evaporator-Generators and Boilers, Slitters, Cutters Hydraulic presses, Sheridan Presses, Dryers. Address Box 50-18 care Paper Trade Journal. TF

WANTED—One second hand 14 foot Globe rotary rag cooker, for pressures up to 120 pounds. Address Box 50-15 care Paper Trade Journal. TF

WANTED

Complete small single cylinder paper machine, Address Box 50-7, care Paper Trade Journal. **J-26**

WANTED—Jumbo rolls cut to specifications for roll toilet tissue (various grades). Submit samples and prices for carload quantities. Address Box 49-620 care Paper Trade Journal.

WANTED

WANTED—Used duplex rotary sheet cutter. Must be in good condition, with Erie Layboy attached. Suitable to cut 72"-76" paper, not over 80". State make, age, model and condition. Address Box 50-11 care Paper Trade Journal. J-5

BUSINESS OPPORTUNITY

WANTED — SALESMAN willing to make token investment. Object—formation of new plant manufacturing cellophane, glassine, combination bags, envelopes. I am not connected. All replies strictly confidential. Address Box 49-616 care Paper Trade Journal. J-12

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CORPORATION; Refinancing; Reorganization; Modernization Programs; Financing service supplied. Walter S. Clugston & Associates, Cambridge City, 19, Indiana. J-12

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Box 50-1, care Paper Trade Journal. J-19

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29 30 31
THE NATIONAL FOUNDATION FOR INFANTILE PARALYSIS

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Nopco Chemical Co.
Norton Co.

ADHESIVES
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American Paper Machy. & Engrg. Works, Inc.
E. I. Du Pont De Nemours & Co., Inc.
The Goodyear Tire & Rubber Company
Monsanto Chemical Co.
National Starch Products, Inc.
Nopco Chemical Co.

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Downingtown Mfg. Co.
Hardinge Company, Inc.
E. D. Jones & Sons Co.
D. J. Murray Mfg. Co.
Moore & White Co.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Valley Iron Works Co.

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APRON CLOTH
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Smith Winchester Mfg. Co.
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Appleton Machine Co.
Carthage Machine Co.
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Link Belt Company
Magnus Metal Corp.
The Moore & White Co.
Shartle Brothers Machine Co.
Timken Roller Bearing Co.
Valley Iron Works Co.

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Black-Clawson Company
Dilts Machine Works, Inc.
Downingtown Mfg. Co.
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Morden Machines Co.
J. J. Ross Company
Ross Paper Machy. Co.
Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Smith & Winchester Mfg. Co.
Valley Iron Works Co.

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The Goodyear Tire & Rubber Company
Link Belt Company
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Rohm & Haas Co.
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The Biggs Boiler Works Co.

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Kalamazoo Tank & Silo Co.
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Walworth Company

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J. J. Ross Company
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Shartle Brothers Machine Co.
Smith & Winchester Mfg. Co.
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Waldron Corp., John

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American Cyanamid Co., Industrial Chem. Div.
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Magnus Metal Corp.
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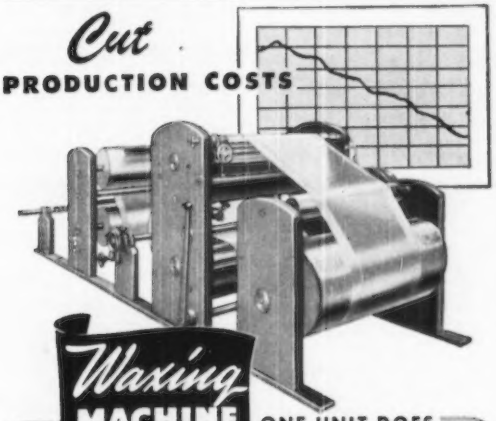
Cut PRODUCTION COSTS



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● Specifically processed and controlled for ease of conversion under all practical mill conditions. Also, special grades of starch for:

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Gibbs-Brower Company, Inc.
Hydson Sharp Machine Co.
The Mayer Machine Co., Inc.
Moore & White Co.
Potdevin Machine Co.
Shartle Brothers Machine Co.
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Weber, Herman G., & Co., Inc.

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Paper & Industrial Appliances

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Alvin H. Johnson & Co., Inc.
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Shartle Brothers Mch. Co.
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Farrel-Birmingham Co., Inc.
E. D. Jones & Sons Co.
Koppers Company, Inc.
Link Belt Company
Moore & White Co.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Valley Iron Works
Waldron Corp., John

CRANES

Cleveland Crane & Engrg. Co.
Industrial Brownhoist Corp.
Link Belt Company
Whiting Corp.

CUTTERS

Dilts Machine Works
Gibbs-Brower Company, Inc.
Thomas W. Hall Co.
Moore & White Co.
Perkins & Son, Inc., B. F.
The Smith & Winchester Mfg Co.
Taylor, Stiles & Co.

CYLINDERS
Askania Regulator Company
M. W. Jenkins Sons, Inc.
National Tube Co.

DAMPENERS
Perkins & Son, Inc., B. F.
Valley Iron Works Co.

DECKLE WEBBING
Williams-Gray Co.

DE-INKING
Dilts Machine Works
General Dyestuff Corp.
Kinsley Chemical Co.
Roderick O'Donoghue
Shartle Brothers Machine Co

DEINKING CHEMICALS
E. I. Du Pont De Nemours & Co., Inc.
General Dyestuff Corp.
Kinsley Chemical Co.
Monsanto Chemical Company

DE-MINERALIZING EQUIPMENT
Hungerford & Terry, Inc.

DENSOMETERS
W. & L. E. Gurley

DESIGN CONSTRUCTION
Ebasco Services

DETERGENTS
Calgon, Inc.
Cowles Chemical Co.
General Dyestuff Corp.
Monsanto Chemical Company
Nopco Chemical Co.
Rohm & Haas Co.
Wyandotte Chemicals Corp.

DEWAXING CHEMICALS
General Dyestuff Corp.
Nopco Chemical Co.

DIGESTERS
Babcock & Wilcox Co.
The Bigge Boiler Works Co.
Lukenweld
Pusey & Jones Corp.

DIRTEC
Bird Machine Co.

DISPERSING AGENTS
Calgon, Inc.
General Dyestuff Corp.
Monsanto Chemical Company
Nopco Chemical Co.
Rohm & Haas Co.

DOCTORS
Bird Machine Company
Black-Clawson Company
Downingtown Mfg. Co.
Lobdell Co.
Lodding Engineering Corp.
The Moore & White Co.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.

DOCTOR BLADES
Bird Machine Company
Black-Clawson Company
Lodding Engrg. Corp.
The Moore & White Co.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.

DRIERS
Black-Clawson Company
Downingtown Mfg. Co.
Gibbs-Brower Company, Inc.
Hardinge Company, Inc.
Lukenweld
The Moore & White Co.
Murray Mfg. Co., D. J.
J. J. Ross Company
Red-Ray Mfg. Co., Inc.
Ross Paper Marchy. Co.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Valley Iron Works Co.
The Youngstown Welding & Engrg. Co.

DRIVES
Allis-Chalmers Mfg. Co.
Appleton Machine Co.
Bird Machine Co.
Black-Clawson Company
Chain Belt Company
Dilts Machine Works
Downingtown Mfg. Co.
Fairbanks, Morse & Co.
Farrel-Birmingham Co.
General Electric Company
Gibbs-Brower Company, Inc.
Rodney Hunt Machine Co.
Link Belt Company
Moore & White Co.
Murray, D. J., Mfg. Co.
Pusey & Jones Corp.
J. J. Ross Company
Ross Paper Machy. Corp.
The Sandy Hill Iron & Brass Works
Valley Iron Works Co.
Westinghouse Electric Corp.

DRYER DRAINAGE
Stickle Steam Specialties Co

DUSTERS
Appleton Machine Co.
Downingtown Mfg. Co.
Frank W. Egan & Co
M. W. Jenkins Sons, Inc.
E. D. Jones & Son Co.
Moore & White Co.
D. J. Murray Mfg. Co
John Waldron Corp.

DUSTING BRUSHES
M. W. Jenkins Sons, Inc.

DYESTUFFS
American Cyanamid Company. Calco Chemical Div.
Ciba Company
E. I. du Pont de Nemours & Co., Inc.
Geigy Co., The
General Dyestuffs Corp.
National Aniline Division, Allied Chemical & Dye Corp.
Witco Chemical Co.

EMBOSSING ROLLS
The Appleton Machine Co.
Frank W. Egan & Co.
Gibbs-Brower Company, Inc.
Northern Engraving & Mch. Co
B. F. Perkins & Son, Inc.
John Waldron Corp.

EMULSIFIERS
General Dyestuff Corp.
Nopco Chemical Co.
Rohm & Haas Co.
Wyandotte Chemicals Corp.

ENZYMES
Rohm & Haas Co.
Pillsbury Mills, Inc.
Vanderbilt Co., R. T.

EVAPORATORS
Davis Engrg. Corp.
Foster Wheeler Corp.
Goslin-Birmingham Mfg. Co. Inc.
Murray, D. J., Mfg. Co.
Swenson Evaporator Co., Div of Whiting Corp.

EXPANDERS
Mount Hope Machinery Co.

FANS
General Electric Co.
B. F. Perkins & Son, Inc.
Ross Engineering Co., J. O
Stephens-Adamson Mfg. Co.

FEEDERS
Hardinge Company, Inc.
Merrick Scale Mfg. Co.
Leeds & Northrup

FELTS
Appleton Woolen Mills
Asten-Hill Mfg. Co.
Bulkley, Dunton Pulp Co., In
Draper Bros. Corp.
Huyck & Son, F. C.
Lockport Felt Co.
Mt. Vernon-Woodbury Mills Inc.
Morey Paper Mill Supply Co
Orr Felt & Blanket Co.
Shuler & Benninghofen
Waterbury Felt Co.
Waterbury, H., & Sons Co.
Williams-Gray Co.

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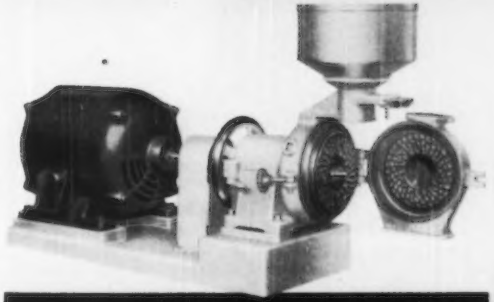

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Moore & White Co.
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Shartle Brothers Machine Co.
Waldron Corp., John

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Vanderbilt Co., R. T.
Witco Chemical Co.

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Witco Chemical Co.
Walworth Company

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Walworth Company

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Shartle Brothers Machine Co
Smith & Winchester Mfg. Co
Valley Iron Works Co.
Westinghouse Electric Corp

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Norton Company
Samuel C. Rogers and Company
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Red-Ray Mfg. Co., Inc.
Ross Engineering Corp., J. O.
Stickle Steam Specialties Co.
Valley Iron Works Co.
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Heppenstall Company
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The Moore & White Co.
Taylor Stiles & Co.
Valley Iron Works Co.

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DeZurik Shower Company

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The Biggs Boiler Works Co.
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Dilts Machine Works
W. & L. E. Gurley
E. D. Jones & Sons Co.
Leeds & Northrup Company
National Technical Laboratories

Taylor Instrument Companies
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Valley Iron Works Co.

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Dilts Machine Works.

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Gibbs-Brower Company, Inc.
Hamblet Machine Co.
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Socony-Vacuum Oil Co.
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The Texas Company
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Moore & White Co.
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C. J. Ross Company
Ross Paper Machy. Corp.
The Sandy Hill Iron & Brass Works
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Smith & Winchester Mfg. Co.

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Thomas W. Hall Co.
Hudson Sharp Machine Co.
Langston Co., Samuel M.

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Davis, Frank H., Co.
Dilts Machine Wks.
Frank W. Egan & Co.
Gibbs-Brower Company, Inc.
Murray, D. J., Mfg. Co.
Moore & White Co.
Potdevin Machine Co.
Shartle Brothers Machine Co.
Waldron Corp., John

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Babcock & Wilcox Co.
Crane Company
Michigan Pipe Co.
Michigan Steel Casting Co.
National Tube Co.
Walworth Company
Youngstown Welding & Engrg. Co.

PIPE FITTINGS
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The American Rolling Mill Co.
Crane Company
Michigan Steel Casting Co.
Phoenix Products Co.
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Monsanto Chemical Company
Rohm & Haas Co.

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Perkins & Son, Inc., B. F.

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Babcock & Wilcox Co.
The Bigge Boiler Works Co.
J. O. Ross Engrg. Corp.
Lukenweld Division
Lukens Steel Company
Timken Roller Bearing Co.

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Black-Clawson Company
E. D. Jones & Sons Co.
Shartle Brothers Machine Co.

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Testing Machines, Inc.

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The Bigge Boiler Works Co.

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Dietz Machine Works
Farrel-Birmingham Co.
Gibbs-Brower Company, Inc.
Thomas W. Hall Co.
Hudson-Sharp Machine Co.
The Moore & White Co.
Paper Converting Machine Co. Inc.
Potdevin Machine Co.
Shartle Brothers Machine Co.
Valley Iron Works Co.
Waldron Corp., John
H. G. Weber & Co., Inc.
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PULP STOCK VALVES
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Shartle Bros. Mach. Co.

PULPERS
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Dilts Machine Works
E. D. Jones & Sons Co.
Shartle Brothers Machine Co.

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PULPSTONES
Norton Company

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Black-Clawson Company
Buffalo Pumps, Inc.
Byron Jackson Co.
DeLaval Steam Turbine Co.
Dorr Company
Downingtown Mfg. Co.
Fairbanks, Morse & Co.
Frederick Iron & Steel, Inc.
Gibbs-Brower Company, Inc
Johnson Corp.
Moore & White Co.
Nash Engineering Co.
Roots Connersville Blower Corp.
J. J. Ross Company
Ross Paper Machy. Corp.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Smith & Winchester Mfg. Co.
Warren Steam Pump Company

RADIANT BURNERS
Red-Ray Mfg. Co., Inc.

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General Dyestuff Corp.
Rohm & Haas Co.

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Gibbs-Brower Company, Inc.
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Bulkley, Dunton Pulp Co., Inc
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Moore & White Co.
D. J. Murray Mfg. Co.
Pusey & Jones Corp.
Ross Engineering Corp., J. O
Valley Iron Works Co.

REELS
The Appleton Machine Co
Black-Clawson Company
Dilts Machine Works (Kohler System)
Downingtown Mfg. Co.
Hudson Sharp Machine Co.
Moore & White Co.
Paper Converting Mch. Co
Rodney Hunt Machine Co.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
The Smith & Winchester Mfg Co.

REFINERS
Appleton Machine Co.
Bahr Brothers Mfg. Co
Bauer Brothers Co.
Dilts Machine Works
Gibbs-Brower Company, Inc
E. D. Jones & Sons Co.
Morden Machines Co.
Murray, D. J., Mfg. Co.
Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co
Sutherland Refiner Corp.
Valley Iron Works

REGULATORS
American Paper Machy. & Engrg. Works, Inc.
Allis Chalmers Mfg. Co.
Armstrong Machine Works
Bird Machine Company
The Bristol Company
DeZurik Shower Company
The Foxboro Company
General Electric Co.
Johnson Corp.
Leeds & Northrup Company
Minneapolis-Honeywell Regulator Co.
National Technical Laboratories
Shartle Brothers
Stickle Steam Specialties Co.
Taylor Instrument Companies
Wallace & Tiernan

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Timber Engrg. Co.

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The Dow Chemical Company
The Goodyear Tire & Rubber Company
Hercules Powder Co.
Monsanto Chemical Company
Rohm & Haas Co., Resinous Products Div.

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American Cast Iron Pipe Co.
Appleton Machine Co.
Black-Clawson Company
Downingtown Mfg. Co.
Frank W. Egan & Co
Farrel-Birmingham Co.
Gibbs-Brower Company, Inc.
Lobdell Co.
Edward J. McBride & Co.
The Moore & White Co.
D. J. Murray Mfg. Co.
Perkins, B. F., & Sons Co.
Philbrick Engrg. Corp.
Pusey & Jones Corp.
J. J. Ross Company
Ross Paper Machy. Co.
Rodney Hunt Machine Co.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Smith & Winchester Mfg. Co.
Valley Iron Works Co.
Waldron Corp., John
The Youngstown Welding & Engrg. Co.

ROLL COVERS
The Cincinnati Rubber Mfg. Co.
The Goodyear Tire & Rubber Company
Edward J. McBride & Co.
Stowe-Woodward, Inc

ROLL HANDLING EQUIPMENT
Dilts Machine Works (Kohler System).

ROLL STANDS
Cameron Machine Co.
Frank W. Egan & Co.
Moore & White Co.
Potdevin Machine Co.
John Waldron Corp.
H. G. Weber & Co., Inc

ROPE CARRIERS
The Moore & White Co.

ROTARY BOILERS
The Biggs Boiler Works Co.

ROTARY STEAM JOINTS
Johnson Corp.
The Moore & White Co.
Perfecting Service Corp.

RUBBER PRODUCTS
The Goodyear Tire & Rubber Company

SATURANTS
American Anode Div.

SATURATING MACHINES
Black-Clawson Company
Dilts Machine Works
Frank W. Egan & Co.
Gibbs-Brower Company, Inc.
Moore & White Co.
Noble & Wood Machine Co.
Potdevin Machine Co.
Shartle Brothers Machine Co.
Waldron Corp., John
Weber, Herman G

SAVEALLS
Bird Machine Company
Hardinge Company

SCALES
Fairbanks, Morse & Co.
Merrick Scale Mfg. Co.
Testing Machines, Inc.

SCREEN PLATES
Bird Machine Company
Fitchburg Screen Plate Co.
Magnus Metal Corp.
Morey Paper Mill Supply Co.
Testing Machines, Inc.

SCREENS
Allis-Chalmers Mfg. Co.

Appleton Wire Works
Appleton Machine Company
Bird Machine Company
Carthage Machine Co.
Dilts Machine Works, Inc.
Downingtown Mfg. Co.
Gibbs-Brower Company, Inc.
E. D. Jones & Sons Co.
Link Belt Company
Moore & White Co.
D. J. Murray Mfg. Co.
J. J. Ross Company
Ross Paper Machy. Co.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Stephens-Adamson Mfg. Co.
Valley Iron Works Co.

SHEET MACHINES

Gibbs-Brower Company, Inc.
Thomas W. Hall Co.
Valley Iron Works Co.

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Bird Machine Company
DeZurik Shower Company
Downingtown Mfg. Co.
Moore & White Co.
Sandusky Fdy. & Mch. Co.
Shartle Bros. Mach. Co.
Smith & Winchester Mfg. Co.

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Bauer Brothers Co.
Carthage Machine Co.
Gibbs-Brower Company, Inc.

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American Cyanamid Company, Industrial Chemicals Division
Black-Clawson Company
The Dow Chemical Company
du Pont, E. I., de Nemours & Co.
Hercules Powder Co.
The Hubinger Co.
Monsanto Chemical Company
National Aluminate Corp.
Stein-Hall Co., Inc.

SIZING TESTER

W. & L. E. Gurley
Testing Machines, Inc.

SLIME CONTROL

The Dow Chemical Company
E. I. du Pont de Nemours & Co.
General Dyestuff Corp.
Monsanto Chemical Co.
National Aluminate Corp.
Rohm & Haas Co.
Vanderbilt Co., R. T.

SLITTERS

Black-Clawson Company
Cameron Machine Co.
Carthage Machine Co.
Dietz Machine Works
Dilts Machine Works
Downingtown Mfg. Co.
Frank W. Egan & Co.
Gibbs-Brower Company, Inc.
Thomas W. Hall Co., Inc.
Hamblet Machine Co.
Hudson Sharp Machine Co.
Langston Co., Samuel M.
Moore & White Co.
D. J. Murray Mfg. Co.
Potdevin Machine Co.
J. J. Ross Company
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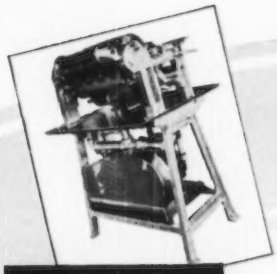

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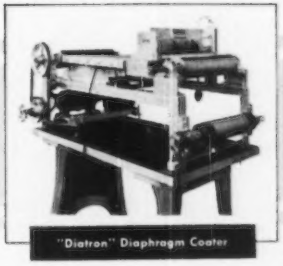

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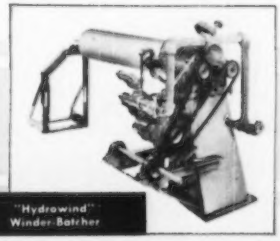

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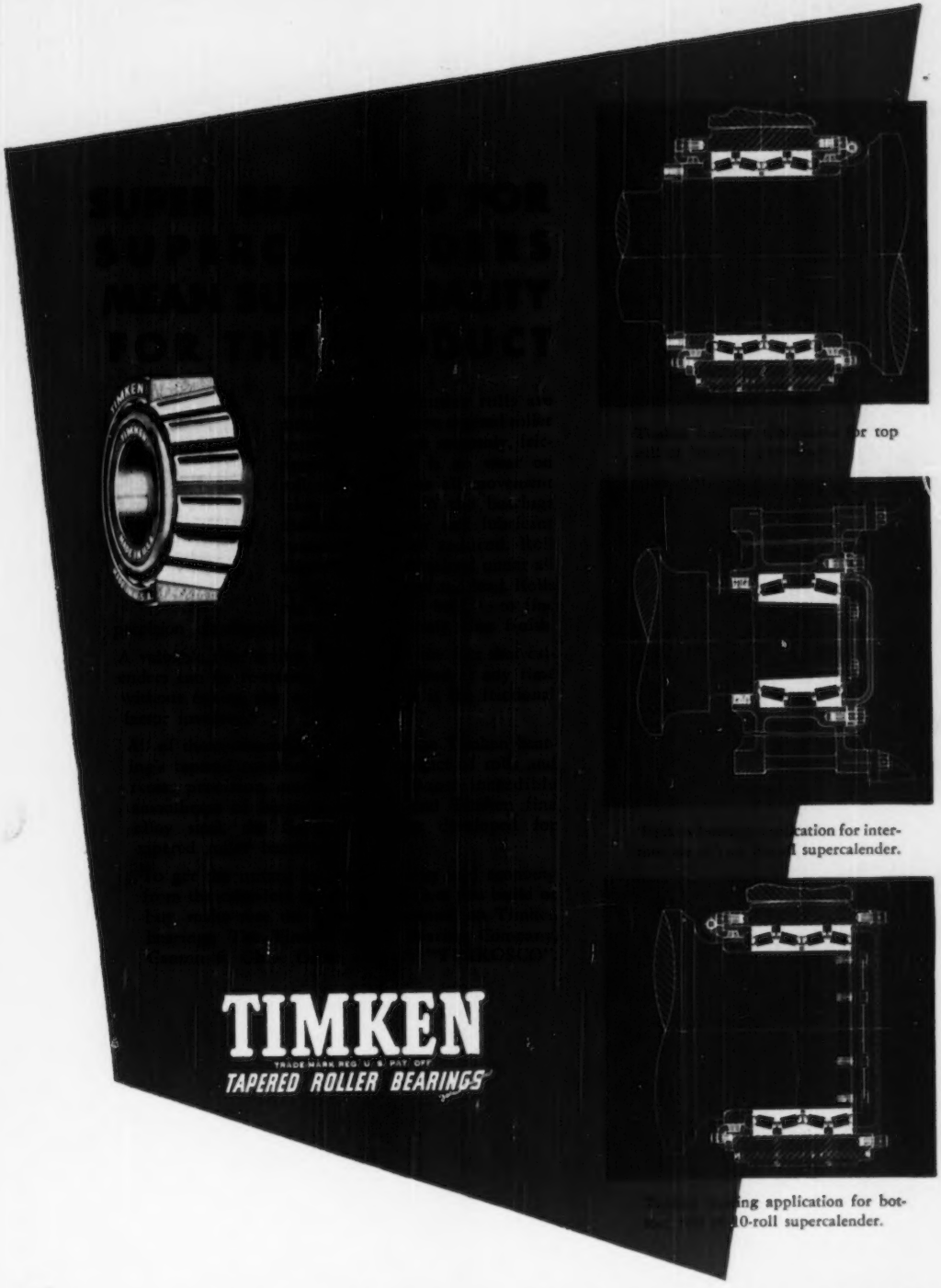
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